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TRANSACTIONS

OF THE

WORCESTER COUNTY

HORTICULTURAL SOCIETY,

A. D. 1894-95.

PART I.

Worcester, Mass.
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1894.

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WORCESTER COUNTY
HORTICULTURAL SOCIETY,
A. D. 1894.

ANNUAL REPORT OF THE SECRETARY.

To the Members

of the

Worcester County Horticultural Society:

It has been a long time since your *Secretary* could so cordially congratulate you upon the manifest, increasing prosperity of the Society. By this I mean not so much a gain in material resources, since we have suffered in common with others from the late prevalent depression in business activity. But, under the circumstances, you must realize that any reduction of indebtedness is a signal gain; nor can you fail to take note of that lively interest in our weekly exhibitions which became so evident during the past official year. Accessions to your Roll of Membership are counted by the score, comprising all ages and either sex; men in the prime of life, who have proved all things and would fain hold fast that which is good; and their juniors, in the first flush of eager expectancy, who have yet to learn that fruition is the child of many disappointments, and are too sanguine to have their hearts made sick by hope deferred. Our exhibitions have been well attended; largely by those who evinced genuine interest in them, as well for the instruction imparted as for their intrinsic attraction. And for what other purpose do we hold them, at great expenditure of money, labor, and time! Let us rejoice that the gospel which

we have expounded, so long and wearily, is at last yielding its harvest! Let us take courage, and resolve that we will continue to merit success by ever striving for improvement! And let it be our fixed, inflexible policy to impress upon the consciousness of the community, that the aim and object of our Society,—its reason for existence,—is not the distribution of so much money by way of premiums for specimens exhibited; but rather to ensure that there shall be specimens worthy of exhibition which shall not derogate from the past floral and pomological rank and reputation of Worcester County.

The names of those who have served this Society, since its earliest organization, in the capacity of *Librarian*, may be counted on the fingers of one hand. Of them all, to Clarendon Harris belongs the exceeding credit. Of studious tastes, a book-seller of good repute and sound judgment, of closest kin to the Librarian of Harvard University for a generation, no man could have been found so well fitted, by natural inclination or business training, to see to the proper filling of your empty shelves. For it was his concern, or at least he so construed it (and who shall impugn the correctness of his decision?), to provide for the legitimate wants of a Society, founded in a rural County of Massachusetts, for the declared purpose of "Advancing the Science, and encouraging and improving the Practice of Horticulture," within a territory of limited area it may be, but yet of such diversified climate and soil as to admit of the cultivation of all the choicer fruits of the temperate zones. When he took charge of your Library, then but a name, *Hovey's Magazine* was still in its infancy, the *Gardener's Chronicle* had not yet been published, nor had Andrew J. Downing embodied his stores of experience and study in that priceless work which has so long directed the steps of the American Pomologist. When he resigned his charge to the inexperienced hands of the present writer, Mr. Harris transferred a choice collection of volumes, mostly bound, that might be said to comprehend a summary of the best approved Horticultural knowledge and practice to that date, of the best editions, by authors whose fame acquires new lustre with every passing day.

Nor should the felicitous character of his surroundings, in that connection, be overlooked. That was not an era of clubs; people keeping early hours and electing the homestead rather than herbergage. But such wholesome customs did not preclude good fellowship; and the day was accounted ill-spent whereof a half-hour had not been pleasantly occupied in the book-store, or office subsequently, of Mr. Harris. Of that rare company, were Frederic William Paine, Anthony Chase, John Milton Earle, William Lincoln, Isaac Davis, Benjamin F. Thomas, and, need I add? John Green. All versed in polite literature, each devoted to Horticulture for its own sake and not its possible premiums, and every one actively interested for the welfare of the young Society which they had just united to establish. To their unselfish liberality may we attribute the early formation of the Library itself, its nucleus, in default of other resources, being the volumes given by those gentlemen from their private collections. Meeting for the daily pinch of snuff, as was their wont and the custom of their time, they constituted a sort of volunteer council, prompt to discern needs which they were equally quick and ready to supply. So that it happened, without public fuss, or fume of newspaper, that there was a gradual, steady accretion to the stock of sound knowledge essential to mastery of Horticulture, so far as declared in print by its recognized scientists. And it may be asserted, with entire confidence, that, when it was deemed expedient to transfer the Library to this Hall, in the interest of its more general use, no collection of its size could be named better suited to its specific aim and object, than that which Clarendon Harris delivered in such admirable condition to your *Secretary* who, A. D. 1862, was elected Librarian.

And now, having served in that capacity for a long series of years, subsequently acting as Chairman of your Committee on Library and Publication, I take occasion thus publicly to repel the assumption that there has been any dereliction of duty on the part of successive Librarians down to the present day; or that the Committee on Library has been remiss in official oversight and action. The files of Journals and Mag-

azines have been perfected, as published, although some may seem deficient to those who are not aware that their issue was suspended because of inadequate patronage due to lack of remunerative appreciation. Of this, the *Floral Magazine* and the *Florist and Pomologist*, are deplorable instances abroad; while *Hovey's Magazine* and *The Gardener's Monthly* have left a void not exactly filled, at home, by any of their more pretentious successors. Of State Reports, more precisely designated as Agricultural, many series were discontinued during and because of the War of Secession, in several cases never to be resumed. Some of you may be surprised to learn that even the imperial State of New York felt so far constrained by necessity as to put a stop to the issue of its excellent Agricultural Transactions. For many volumes from different States we had been under obligations to the State Board of Agriculture (Secretary Russell notably), by whom they had been received in duplicate. For years we had little to proffer in exchange; and perforce became deeply indebted for favors that it was impossible to repay in kind. Latterly, our position, in this respect, has been greatly improved by the resumption of publication of our own Transactions, in enlarged form and much enhanced value.

I assert deliberately, and of personal knowledge, that your Library now comprises all Horticultural literature extant, of sterling authority or worth, with a minimum of printed rubbish. It was never the aim of the Committee to waste your substance, or to lumber up space by a portentous load of mere black-letter. If endowed with a "Stickney Fund," it might be practicable, were it desirable, to accumulate works that are simply curious because of age or rarity, and rare or old because there was never enough demand for them to require a new edition. No one can say that your Committee ever declined to buy a book that commended itself to their judgment, when its purchase was once suggested.

In the specification of official short-comings, the incompleteness of *Curtis's Botanical Magazine*, and equally of the *Transactions* of the Royal Horticultural Society, is particularly noted.

But for years the Royal Horticultural Society published no Transactions, being vitally concerned with the more essential problem of how to maintain its very existence. Virtually bankrupt, it had neither pounds, shillings, nor pence, for the printer. With reference to the *Botanical Magazine*, it need only be said that there has never been a day when an order was not in force in London authorizing a purchase of the only series lacking to complete our set, whenever it could be obtained at a reasonable price. Patient waiters are seldom losers; and who can better wait than an incorporated Society, which knows not death! And now, in behalf of the Committee on Library, which is willing to assume all just responsibility for its action, or omission to act, I desire to state that we plead no inadequacy of means, having got all that we asked for Library purposes, and having asked all that we ought in reason. Few works are written now-a-days that are much more than a re-hash of older treatises. The tendency of contributions from scientists is toward the weekly papers like the *English Chronicle*, or *Garden*, and in our own county the *American Garden* or *Country Gentleman*. When members have expressed a wish to that effect, any designated work of manifest value has been speedily obtained. For more than thirty years scarcely a day has passed in which the writer was not present at the Library, prepared to listen to any one that had a suggestion to make which might augment the intrinsic worth of our collection of books or tend to facilitate their circulation. And it must ever be borne in mind that the use of such Libraries, special as they are, cannot be forced. People may consult them, to settle doubtful points, or to obtain light upon matters of practice, where all is dark elsewhere, but they do not sit down to a perusal of their volumes for mental relaxation or delight, as with the pages of history or romance. The pursuit of artistic or technical learning must be a still-hunt: it cannot be run down by a pack of hounds in full cry.

The statement has been made broadly, that there are many works of exceeding interest and worth which could be had for the bare asking; works published under the auspices and at the expense of the Federal Government; and that upon a request

to our "Congressman" (? Representative, or Senator), they would be supplied so quickly as to take away our breath. Possibly! Yet your *Secretary*, who is not easily discouraged, confesses that his ardor was thoroughly chilled by the indifference that met his repeated and earnest appeals in former years, when acting as Librarian, for copies of the Reports of Explorations in our Western Territories, replete as they were with exact information, and carefully illustrated in both form and tint. All the time, it was notorious that the shelves of second-hand bookstores in Washington groaned beneath their burden of such volumes, sold for a song by members of Congress to whom literature was of value in proportion to what it would bring in "spot cash"! In succeeding years these appeals were renewed with even greater importunity in the Annual Reports of your *Secretary*. When respectful requests are suffered to pass unheeded, what else would you have? Shall the Society go down upon its knees in pliant supplication for any bone that might otherwise be thrown to the congressional dog! Not so do your Committee estimate the position and dignity of the WORCESTER COUNTY HORTICULTURAL SOCIETY in its peculiar sphere and province. Nor in any such ignoble way would they suffer it to demean itself for whatsoever amount of thrift might ensue upon fawning. Here we stand, as for a half-century past, upon our own freehold; instinct with quick, fruitful life; bestowing the results of our experiments and practice freely upon all, without money or price; grateful for aid, and welcoming co-operation; yet able to maintain ourselves in future as of yore, if needs must be and the exacting selfishness of politics so wills. Let parties fuss and fret over "protection," if they choose; and worry over the precise percentage that may be required to save the Sugar Trust from collapse! Some day it will dawn upon the Yankee intellect that the fair flowers and wholesome fruits from our gardens or orchards are as richly entitled to care as the mechanical product of loom or rolling-mill; and that the modest Florist or Pomologist, who seeks simple freedom from oppressive discrimination, shall be favored with all the encouragement possibly derived from observation and research of the ablest scientists

in the public service. Geological and Botanical Surveys are ordered of all portions of the Republic; but their results remain virtually a sealed book. Commissions are created to find out why men do not work, when they have declared that they will not! Or why other some cannot, who are forcibly prevented! But disease and disaster may assail the Apple, Grape, or Peach, threatening the produce of our orchards and farms in myriad destructive forms, and neither Senator nor Representative move for investigation, or trouble themselves to promote inquiry by others. I challenge denial of the assertion that a discovery of an effectual safeguard from the yellows in the peach would be worth more to the American people than all the "Protection" that has ever lain like an incubus upon industrial energy, stifling its free aim and action. Insure immunity from that fell disease, and the pink of the peach blossom shall again tint our local landscape, as in days of yore when Cooledge and Crawford budded and bore their luscious harvest. Do Congress, or the General Court, know or care that within the year just past the very meanest apples have been quoted at from five to seven dollars per barrel? A State Tax to exterminate an insect of exhaustless fecundity—an *Ocneria dispar* which few have seen, and which is most to be dreaded as an invader of the public treasury! A Federal million from a Saccharine Senate to stop thistle-down in its flight! But what measures of practical utility to save the product of our orchards from destruction, or to guaranty the existence of those very orchards against the time when man, ceasing to be carnivorous, shall find nourishment and long life in the fruit that, first planted in Eden, was co-eval with his original existence.

It would be absurd to argue that a Catalogue of a Special Library would be superfluous, while it is entirely reasonable to contend that for the present at least, in our own case, there is no imperative demand for one. Most of those who use our volumes are impelled by some instant need for information, upon a particular fact, or theory, of cultivation. The Librarian can easily attend to all such wants, quickly placing his hand upon the requisite treatise. The scholar, who might spend

hours in research through our more recondite pages, knows well where to look, when allowed free access to our choicer treasures. The most thriftless tendency of our age is its frenzied inclination to jump at conclusions. To assume that all is desirable which we have not in immediate possession; and that our mission must be fruitless unless we hastily acquire, regardless of cost and our financial condition, that which we can as well forego; and which, at best, is but an inadequate means to an uncertain end. All catalogues, card or other, will be of slight avail to those who are indifferent to the contents which they indicate. There are no royal roads to learning; and upon its common highways the ordinary indices sufficiently point out the obvious route. There is but one instance on record where the hedgerows were raked to provide guests at a feast. Was the success then so great as to invite imitation? Our privileges are open to all upon almost nominal terms. That which is proffered gratuitously, or which can be gained without trouble, is seldom greatly valued. Keeping in touch and sympathy with the times, it may still be worth our while to realize that the millennium is somewhat remote.

In an address before an informal concourse of members, on the 11th of January last, the *President* of the Society was pleased to say:

"A Society like this should possess a herbarium. The nucleus of one the Society can have at any time by accepting the offer of a member of the Society and complying with the conditions imposed by him. That gentleman, perhaps the most accomplished botanist in this city, has offered to us his pressed, and mounted, and complete collection of the flora of Worcester County, on condition that the Society provide a suitable, or, in other words, a glass case. If want of room prevents compliance with the condition and consequent acceptance of such a munificent offer, then the sooner we pull down and build anew the better."

Was not the alternative put somewhat strongly? Concede howsoever much value you please to a herbarium,—yet what we have foregone so many years might not be wholly indispensable awhile longer. It is not clear from the text who

should be held responsible for that particular lâches—the omission to do something that is thought ought to have been done. The Committee on Finance, to whom you have confided the custody and supervision of your Estate, have no cognizance of any such offer as stated. Had any definitive proposition to that effect been made to them, they would either have taken what steps were necessary or have submitted the matter to the Society for its decision. Your *Secretary* has neither memory, nor record, of such a proposed gift. It was never his wont to repel "munificence," for which, in the interest of Horticulture, he would rather incline to gratitude. Perhaps it may appear advisable, before we pull down this Hall in order to accommodate a gift that is somewhat veiled by the mists of uncertainty, to pay off the debt incurred for its construction. And even thereafter may obtrude the doubt, alike puzzling and persistent, whether occasion for pyramid and mummy did not, ages since, pass into "innocuous desuetude"! Of yore the lover of flowers pursued his fancy under difficulties hard for us to realize. He was remote from all fellowship, unless perchance the inmate of a monastery; and even then unbroken silence was, in some cases, an inexorable law of existence. His life was that of a hermit. If he studied after sunset, it was by the feeble flicker of a rush-light. He enjoyed few facilities for investigation, and had nowhere to resort for aid. Perforce he must dry his specimens for subsequent research or reference, if he would not repeat his wearisome task of hunting through bog or forest, of patient analysis and lonely discovery, whereof, if aught happened to him, there was no printing-press to preserve the narration.

In this Hall is, or should be ever, a home for Horticulture in its most comprehensive meaning, embracing Floral and Pomological Science and Practice in their truest acceptation. A practice and science which, excluding the charlatan, has no tolerance for the pedant. Too long has Dry-as-Dust ministered as High Priest at the altars of Flora, only yielding place, under direst compulsion, if at all, to the imperative behests of an insatiate mammon. The Florist in fact and verity, confesses no

moribund faith; owes and pays reverence to no spurious priesthood. He relinquishes analysis of pistil and stamen to the student of abstract learning, whose microscope detects germ or fungus, if not bacillus or microbe; because of whose omnipresence and endless fecundity the wonder is that the human race has so long protracted an unwholesome existence. But, in doors or out, in ample field or limited garden, he pursues the bent of his personal taste, thereby escaping the ruts so deadly to intellectual progress; seeking ever the new and worthy; avoiding always whatsoever is found upon trial, to be of ill repute, or worthless, when grown. Before him, in all their vitality, are out-spread root, trunk, branch, leaf, bud, bloom, or fruit. His concern is with the present, letting Autumn and Winter alone, like the dead past, to bury their dead. What need has he, in this age of daily or hourly intercommunication; in this age when thought is borne upon wings of lightning, and perserved upon myriads of printed pages; in this fair land of ours where, in little more than a single day, he can pass from the depressing influence of ice and snow to the bourgeon and bloom of Magnolia and Rose or, in a few hours more, to the fragrance and flavor of Orange and Pineapple; what need has he, or why should he trouble himself, for the withered leaves and desiccated stems of a vegetation that, having fulfilled its allotted mission, died as it ought!

Nor is the science of Botany, so far as in strict justice it can be termed a science, regarded in the same light as formerly by its most advanced votaries. *Meehan's Monthly*, edited by one of the foremost Arboriculturists and Florists in this or any other country, quotes *Professor* Millspaugh to the subjoined effect, if not with open approval at least without declared dissent:

"In the old time, and that not so many years ago, all that was taught of botany, was how to analyse flowers, so as to be able to understand the descriptions in the text books, and thus enable one to collect and distinguish species—after which specimens were carefully dried and put away; and the results of little more value than the results following a boy's collection of postage stamps. In modern times the flower-lover is really

more of a botanist than the old-time collector of museum specimens. He looks into the flowers and watches their growth, endeavors to understand how they are made and studies how they behave; and those particular branches of study indicate a botanist to-day, far more correctly than the mere collector of plants once did. The geography of plants, or the knowledge of how they are distributed over the surface of the earth, has also come to be a very fascinating department of botany, and the investigation of their 'histories' in relation to altitude, climate, and even the relations of plants to insects, have come to be quite as much matters of botanical interest as the older studies which relate simply to the classification of plants!"

In a sketch of the proceedings of the British Association for the Advancement of Science, at its recent session, *Professor* Bayley Balfour, treating of Forestry,

"Went on to show that the practical aspects of Botany were not sufficiently considered now-a-days, that whilst chemistry and physics were turned to utilitarian purposes, botanists confined their attention too exclusively to matters of pure Science.

* * * * * * *

Botany cannot thrive in a purely introspective atmosphere. It can only live by keeping in touch with the national life, and the path by which it may at the present time best do this is offered by forestry."

To which, with its usual catholicity of thought and utterance, the *Chronicle*[1] adds, "If to forestry be added gardening, market-gardening, and agriculture, including vegetable pathology, we fully concur with the Professor."

Cannot our Hall be made to serve awhile longer?

In the early summer a note, whereof a copy is subjoined, was received by your *Secretary:*

"Worcester, Mass., May 29, 1894.

"*Mr. Edward Winslow Lincoln, Secretary,*
Worcester County Horticultural Society,

"Dear Sir:

"The Committee of Arrangements having in charge the New England Fair of 1894, extend a cordial invitation to the Worcester County Horticultural Society to unite with them in

[1] *Gardener's Chronicle*, London.

making the Horticultural display at the coming Fair a credit to this section of the State. Much has been gained in past years by uniting at Fair time and holding a Joint Exhibition, and we trust the very pleasant relations of the past may be continued.

"Trusting the invitation may receive your favorable consideration,

"I remain, very respectfully yours,
"JOHN B. BOWKER, *Sec'y.*"

That invitation was laid before your Committee on Arrangements, etc., and its unanimous decision was officially expressed, as follows:

8: JUNE, A. D. 1894.

Mr. John B. Bowker,
Secretary of Worcester Agricultural Society,

DEAR SIR:

At a meeting of the Committee on Arrangements and Exhibitions, holden on the 7th inst., the Communication from the Agricultural Society, inviting co-operation at their next Annual Joint Exhibition with the New England Agricultural Society, was duly considered and, as a result, the Secretary was requested to reply that, in the judgment of the Committee, the Science and Practice of Horticulture will be better encouraged and promoted by the maintenance on the part of the Horticultural Society of its especial Exhibitions.

With the best wishes for the prosperity of your Society, permit me to subscribe myself

Very respectfully,
EDWARD WINSLOW LINCOLN,
Secretary.

Our own Exhibition was held, in due course, being crowned with signal success and receiving its due meed of praise from numerous strangers, well qualified to judge, who chanced to be in the City. It is understood that the New England Society also "filled space;" although in what shape Horticulture, Floriculture, and Vegetables finally crystallized, must be left for description by the pen of him who parted what God had originally joined together. In hope, if somewhat faint, of light

upon this vexed subject of Terræculture, and the proper display of its results, I have now for well-nigh a generation closely watched the achievements of that astonishing organization which annually folds its tents and silently steals away, leaving the sparse after-math to its local partner. But not even the New England Agricultural Society, with its unique segregation of Horticulture, Floriculture, and Vegetables, can emerge from its chronic chaos and, by mere advertisement or clamor, evoke new form and order in garden or orchard. We show nothing in this Hall, as all-around, steady going fruits, that will take the place of Baldwin or Bartlett! Are they more fortunate over by Agricultural Street, re-inforced as they are by the surprising co-operation of our most prominent Members?

The liberty of an individual to exhibit the product of his labor, or skill, when, where, and as he pleases, can only be curtailed by himself. Except by his own volition his action is free as air. Yet does he not himself impose a degree of restraint upon that natural freedom by the very fact of his affiliation with a Society! Is Horticulture exalted, by reason of Exhibitions elsewhere in Worcester! Then, by just so much are our own Exhibitions depreciated. Is Horticulture degraded, as it careers up and down our streets in electric cars proclaiming, through ophicleide and trombone, the speedy occurrence of "Five Great Races!" If aye,—how can we escape responsibility who participate in the downward steps, becoming parcel and part of the procession that tags after! Do we leave this Hall,—going elsewhere in search of reputation and cultural credit? Where else than here, outside of Suffolk County, could such solid horticultural renown be attained at any time within the last Half-Century! Do we reach out to get individual gain? It is to be hoped that our reward will not become Apples of Sodom; although, if purses are to be scaled down, the loss in such event would not be so hardly borne. Our abstinents and ascetics are invited to a board wherefrom whatsoever can cheer the heart of man is sedulously excluded; and those laborers in a vineyard without grapes, who are tireless in denunciation of wine or beer, face with neither flinching nor protest the

placards that confront them from every fence, whereof the whole space is let at so much per foot, to advertise—"Game-Cock! the King of all Whiskeys!"

The New England, or any other Society that may step into its shoes, misfits at best, comes to Worcester and squats upon an excessive tract of land in the very heart of the City, for which there is legitimate use upon a single week out of the whole year, and from which neither City, County, nor State collect a cent of tax. The silent and ostensibly virtuous partner,—the owner of that land, is a recipient of bounty from the State, taking Six Hundred Dollars ($600.) from the Public Treasury for work in part wherein, to say the least, it does not surpass others less highly favored. Upon that land, bought with fourpences and for which they have since declined an offer in "spot cash" of One Hundred and Twenty-Five Thousand Dollars ($125,000.), they profess to hold for purposes of mere lucre, exhibitions in rivalry with ourselves who throw wide open our doors to any who may choose to compete, or inspect. They claim that bounty from the Commonwealth, to lavish it upon the acrobat and contortionist, for which nevertheless they pay no license, as must every other circus; and for that bounty this Society pays an equivalent tax of Six Hundred Dollars, exacted because its first floor is leased, as it needs must be, to get some revenue wherefrom to defray current expenses. So far as the State of Massachusetts can accomplish it, there is an actual discrimination in money, against us who charge the community nothing, in favor of a Society that does nothing but charge! Not one of our talents is buried in a napkin or otherwise. And yet, theoretical protectionists as are most of this audience, I dare to challenge any one present to dispute my assertion that the whole effort has been for naught! To disprove my statement that, while Apples or Pears may have been shown out of season, and therefore immature and unworthy of notice by any Society that has a reputation to guard, the pre-eminence of the Worcester County Horticultural Society remains unimpaired,—scarcely even affected. And still,—of all this audience who occupy farmstead or grange, is there one who would offer

bob-veal for display,—let alone premium! But what better do they, whether in the line of example or precept, who submit for judgment and award on the fourth day of September, Anjou, Dana's Hovey, Bosc, or Lawrence! Effort without stint has been wasted in a rivalry that has once more approved itself futile. Means that could illy be spared have been literally thrown away in the purchase of horticultural appliances and furniture that, at best, would but feebly approximate our own thorough and ample equipment. Thrown away! I repeat, since we already occupied the entire field of Horticulture, had made adequate provision for its every need at Exhibitions, and hold ourselves ready in all earnestness and with the utmost courtesy, to fulfil our allotted task. So doing, we leave with those to whom they appertain the engrossing and responsible duties consequent upon an honest, whole-souled devotion to specific, time-honored Agriculture. There ought never to be rivalry, nor occasion for strife. The grievous load of indebtedness that weighs upon the Society by Agricultural Street, had its origin in ambition to do too much, fostered by the lying promises of men, who, as a class, are always ready to have others do for them. I know whereof I speak, having yielded to importunity and signed three (3) successive Deeds to land, to remedy incompetent surveys and eke out inadequate lengths of track, whereon the gelding might display a speed which he could never transmit! his owner obtain a field for training, in clamor for whose purchase he could not be too vociferous as, in contribution for its payment, then, as since, he was and continues hopelessly bankrupt!

As for the Society itself which, upon the urgency of D. Waldo Lincoln and O. B. Hadwen, had agreed to relinquish further attempt at Horticultural Exhibitions, you all know how that engagement is kept. Of itself, among the well-informed, competition with our Society appears as impolitic as it is, in fact, preposterous. If prosecuted from an abstract love for horticulture, it is labor lost that were better applied where it might tell to advantage. If persisted in for the sake of gain,—our own Society was long since compelled to abandon the custom of filling an ark with specimens of everything that could not be killed and would not

die; that only counted among the accretions of a dump which no one cared to see, which they certainly would not pay to look at; as, for years, they did not for a view of Strawberry, Rose, or Peach, in perfection. The WORCESTER COUNTY HORTICULTURAL SOCIETY early learned that people will not pay for admission to Exhibitions, however excellent, which they can behold duplicated, if in less degree, at every stall and window of huckster or florist. Will those very people go over to Agricultural Street and pay thrice as much for a sight of inferior specimens merged in a hotch-potch classification!

People outside the sanctuary are easily misled. What more natural than for them to conclude, if our own Members find this Hall inadequate for the advancement of Horticulture in its best accepted science and practice, that they also may do better to stay without its portals! Why should we not let other Societies, arrogant and pragmatical, lose themselves in the mists of pretentious sciolism; wherein clear judgment is befogged; or get ensnared in the nets of Mammon, in whose meshes they will surely perish! Suffer those who like to be blinded by a glow-worm, mistaking its flickering spark for the pure radiance that enlightens the world! But, for ourselves, why cannot we be content with assiduous devotion to that learning and practice wherein we are sure of the mastery? To that knowledge which will add somewhat to the delight of the human palate, and by so much augment the sum of human enjoyment! Your *Secretary* owns to but slight respect for a theory of existence which rejects every pleasure that is within reach, and largely because it is attainable; austerely declining to enjoy the present life, in a futile quest for positive assurance of another, wherein the further one goes the worse he may chance to fare.

We grow Flowers, Fruits, Vegetables:—none better! Others produce live-stock, cattle, sheep, turkeys for Thanksgiving; and to them we gladly concede superiority in their chosen line. There is room enough for either without jostling, if only each will keep to the right. In course of time, the several departments of Terræculture have become too large for a rigid administration under the lax nomenclature that is fashionable,—and

therefore current. We have no longer Cattle-Shows: they have been transmuted into Agricultural Fairs, — too often Fouls! That man is accounted behind the times whose memory reverts with pleasure to the Common and its general enjoyment, where all were welcome to a public annual Holiday;—the one with his quiver full as free from an onerous charge for admission as the youth at whom Cupid had just aimed. Where the side-shows tickled the groundlings, fooling even them but once; where there need be none of that fretful worry about the weather, since sunshine and shekels were not equivalent and the Governor could be counted upon to exhibit himself from interest in the cause and not for reasons of policy. We have lost our Cattle-Shows and in lieu thereof have the Half-Mile Track, the Fifty Thousand Dollar Debt; the weary despair of extrication from liabilities that, if achieved, would only furnish a new pretext for the imposition of additional burdens to stimulate and foster a practice confessedly hopeless, unless the Statutes can be altered so as to tolerate gambling. Conceding all that the wildest enthusiast may demand to the innate nobility of the Horse! Yet it is not as he is described in Job that he is paraded as a spectacle at an Agricultural Hippodrome. Who can detect a "neck clothed in thunder" when the mane is sheared, the hair clipped, the tail docked, and the feet clamped in boots! The whole pretence that the modern trials of speed conduce to an improvement in the breed is dissipated, when you reflect that, oftener than not, the competitors are geldings, and that invariably every possible appliance and trick is employed to gain even the slightest advantage. From all the racing counties of England comes up the universal wail that production of Horse-Flesh tends to degrade and ruin all concerned in it. In this doleful cry farmsteads and grange concur, as in nothing else, that, since the latter-day cult of devotion to pedigree, and servitude to unnatural speed, of two animals at either end of the halter one may be a horse, but the other is invariably and inevitably an ass!

I may be old-fashioned in my notions, but I honestly date the decline in New England Farming, far more than from any or all other causes combined, from the surrender of the Ox and the

substitution of the Horse. Note! that I do not overlook the prosperity of the Market Gardener, who deserves the good fortune for which he labors diligently, but which after all is largely attributable to the propinquity of his customers. *But that is not farming!* Nor do I forget the Dairyman, to whom pasture and silo are subservient, yielding the year around a copious supply, which, at current prices, strips alike customer and udder. But milch-cows do not comprise every "beast of the forest," nor were they exclusively in the vision of the Psalmist when he beheld his "cattle upon a thousand hills." It is fancy-stock bred to a pedigree, salable for an excess that becomes a fault and not especially prized as material for beef. Intensive agriculture might redeem the wasted soils of New England far better than by their abandonment to the invasion of white-weed and whiter birch. But it must be an agriculture that produces the Ox and his carcass, that profits by the saving of his manure whereat it is so fashionable to sneer when so-called fertilizers seek a handy market; and which puts that manure where it will do the most good,—composted about and above the roots of Baldwin, Hubbardston, and Greening. The fruit that will never lack purchasers is such as that to which our accomplished judge awards first premiums. The yield from a whole orchard may not be the like; but neither need an orchardist demoralize a market and ruin his own reputation by attempting to doctor or deacon by misuse of defective specimens. Superior samples of first-class Apples or Pears, grown in this County, may as well be exchanged for the English Shilling as await the slow haggling of local dealers, who are flustered at sight of a barrel and are apt to pinch a dime hard when there is a glut of produce. Grow worthily what you can, converting to cider or pork all that is fit for nothing else.

Is it our wish,—is it for our interest,—and shall it be our aim,—to advance that most important branch of Horticulture—Pomology? A.D. 1893–4, during the year just passing away, we have had no apples for domestic consumption. Even our original mother Eve would have escaped temptation, had she been obliged to look upon a peck of defective and half-decayed Rox-

bury Russets, as did your *Secretary* last March, for which the dealer asked seventy-five cents, with a cheek that looked as if it never knew a blush! We have known what it means to endure an apple-famine. A.D. 1894–5, our trees bend beneath their burden and there threatens to be a glut in our supply. Meanwhile there is a dearth in English orchards, and a large foreign demand appears eager and quick to take what we can furnish in abounding excellence. Always assuming that there is no unpardonable sin in exchange of produce, or barter if you prefer the term; and that there is no lack of patriotism in freighting a ship with the fruit of our orchards, securing a profitable voyage by returning with a paying cargo adapted to our needs. To cite a somewhat famous phrase: "it is a condition, not a theory, that confronts us." We are likely to be overwhelmed by the superfluity of our noblest fruit. Do the frugal orchardists whom I see around me expect to find ready to hand a home-market insatiate—omnivorous? Can any employer, as he reduces wages by one stroke of his pen, create a single new stomach or enlarge the aching void in those existing? If so, well;—for thereafter they may perhaps try to supplement the processes of Nature, aiding her work by augmenting still more that bounty to which our indolence is indebted in usual happy-go-lucky fashion! Our old trees are bearing once again, and there is prospect of a market for what they yield. But did we prune, thin out, manure, do anything in fact, but

"Sitting on the stile, Mary,"

attune our most lugubrious tones to that most shiftless of all refrains—"The Lord will provide!" Will He indeed? If you neglect planting new trees in virgin soil, just wait a few years and admire His provision! But watch and take heed what He will do for you after your old trees are dead from exhaustion, perishing from that very excess of bounty whereon you lazily depend; when your new orchards fail to come into bearing, since you declined setting them out, in the fancy that apples had ceased to be factors in human temptation. Or, worse and more discreditable still, because you would not plant that only posterity might enjoy. And then, degenerate descendants from men

who tamed the savage Indian and a more savage wilderness! fold your arms and look on, as train after train crosses a wide continent and a stormy ocean to deposit its luscious burden in that opulent market which we should have long before forestalled! Ought we to feel assured of a crop in the year to come, resting idle, toiling not, nor sweating to turn a hair in mid-summer heats when thinning should not be denied? Shall we utterly decline to plant new trees, as did our fathers, upon the produce of whose tireless industry we are content supinely to vegetate! Are we satisfied to exhaust our principal, consuming its substance?

Commenting upon the actual results from export of almost every variety of Pears, Plums, Peaches, Grapes, &c., &c., from California, that grand exponent of all forms of approved Terræculture—the *Country Gentleman*—declares that "the experiment is a success; and has demonstrated that California can furnish Covent Garden market with fruit just as well as the Isle of Jersey, and at prices that admit of profitable competition." And then the Editor, writing with all the shrewd sense, if not with the actual pen of John J. Thomas, enlarges forcibly upon the text that I have so often striven to impress upon the Horticulturists of this noble old County of Worcester, whereof the superiors throughout our broad Republic may be counted as the Saints in Sodom:

"Do the fruit-raisers of the East intend to permit the Pacific Slope to monopolize this export trade? If not, it assuredly behooves them to improve enormously the average market value of their own product, by more vigorously fighting their fungous and insect foes, more liberal thinning of the crop as it grows, more unflinching rejection of all imperfect specimens from what are supposed to be standard-grade lots, and much more careful handling and packing. We saw last week at Syracuse, California pears and peaches bringing from *seven to nine times* as much money as those raised in the great fruit regions of central and western New York, not three hours from the retailer's shop; and, what is worse, the California fruit was worth the difference. The specimens were of very uniform size, every one perfect, and so carefully selected and packed that the dealer said he never lost a single one by rotting. The New York lot was of

all sizes and all degrees of imperfection in form, and disgraced by a very considerable proportion of rotten specimens. And as to flavor, the California peaches in their beautiful condition far excelled the great majority of the others; and the California Bartlett pears were in no manner inferior to any Bartlett pears grown anywhere. Let not the New York orchardist flatter himself any longer with the antiquated idea that California fruit is 'good only to look at and to sell.' It is infinitely better to eat than is an appallingly large proportion of the stuff that he insanely sends to market to compete with it."

So much for intrinsic excellence and its marketable appreciation! That selection counts as well, human if not natural, you may judge for yourselves when you note this variation in price of different lots of apples, as quoted September 24th, ult., in the English prices current:

Baldwin, ...$2.52, ...$3.84:
Greening, ...$2.64, ...$3.12:
King, ...$3.12, ...$5.76:

Can we not spare our Kings, if they are so badly wanted and so highly valued? A month later, October 23d, when consignments were coming in at the rate of 100,000 barrels weekly, quotations were as follows:

Baldwin, ...$2.68.....*a* $3.28:
Greening, ...$1.70.....*a* $2.92:
Northern Spy, ...$2.31.....*a* $3.53:
King, ...$2.06.....*a* $3.40:

The prices-current circular adds a pregnant commentary,—"the demand is active for sound and good quality, but the large amount of inferior stock injures the market for better goods." It may not fall within our province, as a Society, to undertake the regulation of international commerce in apples. But it is clearly our duty to take note of abuses that threaten to impair, if not ultimately destroy, a market for our superabundant stores of fruit which, if thrown back upon our hands for any reason, would effectually swamp trade at home. Should not our orchardists take some concerted steps to ensure honest packing, which lies at the foundation of all upright dealing? Your *Secretary*, agreeing with Jefferson that "the world is governed too much," would

be the last man to invite interposition by the State. Yet, if self-interest will not dictate and compel an honest count, quite as essential in commercial Pomology as in current politics, it may be well worth considering whether public inspection should not be exacted and enforced, alike in the interest of the Commonwealth and its individual citizens, as to conserve the fair repute of the County of Worcester!

A problem that often recurs to your *Secretary*, as he watches our Weekly Exhibitions in their unfailing sequence, seems to him one that deserves your serious consideration. Does specification constrict the ambition of our members? Do they confine their effort within the rigid conditions and limits appointed by us in our Schedules? We invite competition between certain classes of Flowers or Fruit, designating by name the varieties that we wish exhibited. Our members respond; sometimes offering twenty or thirty lots of each stereotyped, preferred kind. What else do they grow; if aught, so far as the Society is informed! May we not, unintentionally, discourage the introduction of novelties of standard excellence, that would challenge notice and merit study! Before the formation of this Society, individuals were thrown upon their own resources, having to find out as best they might, if Bartlett or Baldwin were worth cultivation. Vision and judgment were not aided, year after year, by a proffer of premiums to the amount of Three or Five Dollars ($3.00 or $5.00), for graded dozens. Now, naturally enough, it is not surprising that our judgment should be accepted without dispute—our election admitted without cavil or hesitation. Indeed, were such not the case, it might well appear that our Half-Century of corporate existence had been wasted. Unless, in all these years, we have achieved a solid reputation for knowing what is most worthy of being grown in this our County of Worcester, whether it be of Flower, Fruit, or Vegetable, we may as well acknowledge that our efforts have been misdirected, and go out burying our inadequate talents in the first cabbage-leaf that will serve for their shroud.

But if we have actually established our title as a Society which has attained its aim in howsoever insufficient measure, thereby

"advancing the Science and encouraging and improving the Practice of Horticulture," is it not manifest that the path which we blaze is likely to be the track of the aspiring novice,—the preference that we indicate become the choice of all who seek for a guide and find it in our acts and declarations! Are they likely to go astray! Or will they strike out for themselves in pursuit of newer Hesperides;—in less perilous quest of more modern apples. And therein is the basis for a contention that, if you place implicit trust in your Judges, you might as well confide to their decision the entire matter of pecuniary awards. For their name is legion who believe that our present system is defective in that its operation is largely contingent upon human frailty. Is it the intention of the Society when it invites competition, in a certain manner and under explicit conditions, to bestow marked favor upon those who refrain deliberately from open competition? Indeed, how can you expect honorable rivalry when malingering gets the same reward as faithful service! Were the judges authorized to confer substantial recognition for meritorious exhibits, presented without being invited in your Schedule, it is likely that as exact justice would be meted out as now. Yet even Angels might well hesitate to act as umpires in our earthly rivalry; and, as we cannot command angelic judgment there is slight hope for amendment in future. But still is production of Baldwin or Bartlett to be forever classed with Infant Industries, to be pampered and petted, for all time, as throughout the Half-Century last past! The *Country Gentleman* recognizes the difficulty of finding varieties of fruit that will suit every locality. It reproduces that old chestnut of about all pomologists of note, since Marshall P. Wilder with his Vicar of Winkfield, that he would plant 99 out of 100, of his especial pet, rounding off the century with one more of the same, by attributing it to a distinguished orchardist of Western New York who thus advised exclusive culture of the Baldwin Apple. Still, to illustrate "how much that variety has gone back," it cites the opinion of a Canadian orchardist who stated, in a public address before the Fruit-Growers of Ontario, that "the R. I. Greening was coming up to the Baldwin and would pass it." But the

question with us would seem to be,—Have we not already lost assurance of the Greening in its pristine perfection, and is there permanent redemption for the Baldwin from manifest degeneration and intermittent fruition? Yet, hark! was not that a voice from Mountain Street, intoning in low, harmonious bass,—eyes have you, oh *Secretary!* and seeing, cannot behold, those Thirty-Four (34) superb dozen of Greenings, on the 18th of October, ulto.; or, a week later, that equal, unparalleled display of Baldwin! Precisely! and because of those wonderful exceptions to a mediocrity almost invariable do I urge my contention. Can you tell, oh self-satisfied Granger! why those Apples were borne, in this especial year, of such surpassing excellence and beauty? Did you contribute aught to it, whether by bounty of manure, by reduction of excessive fecundity, by doing anything, in short, that may fairly be claimed to have brought a blush to their cheeks or augmented their soil and substance? Can you feel confident that you will ever look upon their like again, except as I before hinted, under the fatuous conceit that the Lord will provide! Has He not just shown you what may be, to profit by the lesson and thus ensure that it shall be? Would not all buyers like to obtain such fruit, instead of the inferior or defective specimens usually found on sale; or, as throughout the last year, none at all. Vegetables, within the observation of the writer, have so improved; skill in their cultivation has so highly developed; that it would almost seem as if further advance were beyond attainment. Does any one labor more diligently than the market-gardener, or show better returns for his toil expended! Does any one work less assiduously than the average orchardist, who regards suckers as inevitable thieves: who has known the caterpillar from boyhood and has come to look upon him as a member of his household; and who will be sure to flatter himself, because of what he has seen in this Hall, on the 18th and 25th of October, ult., that his cellar will be filled to repletion if only he has a ladder and can get enough barrels. Only, why go to the trouble of climbing a ladder when, to him who waits, will come windfalls!

Are we not, insensibly perhaps but nevertheless surely, degrading the standard heretofore established in our schedule? Doubtless the later we live the more opportunity is furnished to learn. But are all the lessons set before us worth learning? In our selection of Pears, for example, as the years have rolled by, we eliminate native and long-tried varieties, or else reduce them to a lower level than that wherein they had long approved themselves worthy. Marshall P. Wilder died in the faith that the surest prospect for the development of excellence, whether in the Apple or Pear, would be found in the careful cultivation of native kinds. Yet we have no room for the Columbia, barely tolerate the Dix, and regard the Washington as pretty wax-works! Now the Dix is as good as Louise Bonne, which it succeeds, keeps later, and is well worth waiting for if wait you needs must. People ask for a later-keeping Winter pear and are put off with suggestion of this or that, hard to grow and harder to ripen, while all the while the Columbia is at their service. Of foreign varieties, Marie Louise, one of the three very best abroad, gets faint recognition by dint of earnest championship. Winter Nelis is rated below those egregious humbugs, Angoulême and Clairgeau, whose girth, or flaming cheeks, should not suffice to maintain them in cultivation. So much do I esteem the Nelis, although I fail to earn its premiums; and so thoroughly do I believe in each Member of our Society extracting from its original package his Thanksgiving champagne; that I recall your attention to the opinion of Andrew J. Downing who, in his original work, Ed., 1847, says:

"The Winter Nelis holds in our estimation, nearly the same rank among Winter Pears that the Seckel does among Autumnal varieties. We consider it *unsurpassed* in rich, delicious flavor, and indispensable to every garden however small. It is a very hardy and thrifty tree, and bears regular crops of Pears, which always ripen well and in succession."

You may have noted that I mention enjoying it at Thanksgiving, when most of us must, if at all. Yet John C. Ripley and John C. Newton, with suitable fruit-rooms, found no difficulty in keeping the Winter Nelis in perfect condition until the

May following the time of picking. As to the quality of the pear, Mr. Downing's opinion describes it as truly now as when it was uttered. That it is an "ugly duckling" may not be disputed. The specimens shown in our Hall of late years have been very inferior. On the other hand, none could be better than those exhibited October 25th, by Mrs. Mary E. Woodward. If the tree that bore them is young, is located in the open, and has received proper care, as is understood, the lesson is obvious and requires no commentary.

Describing the Columbia, which originated in Westchester County, New York, and which he illustrates by a colored plate, Downing says:

"This splendid American pear is one of the most excellent qualities, and will, we think, become more generally popular than any other early Winter fruit. It is large, handsome, very productive, and has a rich, sugary flavor resembling, but often surpassing, that of the Beurrê Diel."

Times without number have I been asked to recommend some Winter Pear. The task was too difficult. But why should I hesitate to recall to your attention the opinion of our very highest pomological authority, re-inforced as it has been by the observant experience of the few of our Members who have profited by following his judgment! Bear in mind that it is commended as a Winter pear! which implies that it must be suitably kept and properly ripened. Individually, I went much further and fared far worse. Instead of Columbia, Duchesse de Bordeaux cumbers my grounds,—a fruit which I would gladly contribute to swell that fragrant deposit over which perfumed zephyrs blow to the delectation of our friends on Shrewsbury Heights. And finding ourselves in sight of "Shrewsbury Clock," it matters little by what zephyr borne thither, shall we dismiss mention of that remarkable display of *Lawrence*, October 25th, by our valued associate, Mr. Oliver B. Wyman? Yet, after all, what did we learn? We saw pears that none of us could rival, nor even approach in excellence. But who knows under what conditions those specimens were produced! Was the tree young, or old; has it been highly manured, or let severely alone? Was

it suffered to bear an exhaustive crop, or was excessive fecundity checked, or reduced? These are all considerations to be weighed carefully. Still, that they may be so weighed, they must first be precisely known. And how little time do any of us have, in the hurry and rush of that final Autumnal Exhibition, to put questions, or to ponder the value of answers! Yet would not all who possess trees of that variety prefer to grow pears like those of Mr. Wyman! All this possible inquiry, all this positive dearth of exact intelligence, oppresses the mind of your *Secretary*, as he reflects upon the responsibility that rests upon this Society by the simple fact of the relation it has voluntarily assumed. Shall we advance the Science, and encourage and improve the Practice of Horticulture; or shall we continue stolidly in a customary rut, content to pocket premiums and alert to grumble at the judges who determine their award!

The profuse award of gratuities, in the Floral Department more particularly, would seem to challenge your attention and invite your interposition of a check. It is eminently proper to recognize special displays of surpassing excellence, from places so far distant as Whitins or Indian Orchard, illustrating as they do the progress of discovery and the benefit of practical instruction by object teaching. Yet they are alike inappropriate and a waste of resources that should be administered frugally, when they are applied as soothing syrup for defeated competitors, or rubbed in for balm in the case of some who are being taught to regard Horticultural Exhibitions as a source of material gain. This, at least, must be conceded, that when the award of gratuities amounts to $137.00 in a department favored with an appropriation of $700.00, besides the special assignment of $200.00 for Chrysanthemum, there is imperative need to call a halt! Vegetables, in their manifold forms of utility, and as long ago as the first Roman Secession Menenius Agrippa demonstrated the absolute necessity of provision for the belly, get but $300.00 from our treasury. In no other department of our work is there such decided evidence of advance in the practical application of Horticultural Science. In none do our appropriations show less evidence of actual appreciation. Even

fruit has been made to halt behind, with laggard pace. Your *Secretary* is yearly more confirmed in the opinion that the Society would do more to promote its legitimate aims—advancement of the Science and promotion of the Practice of Horticulture, by dismissing all thought of what may attract a throng of yawning spectators, and limiting its attention and efforts to its peculiar province of encouraging origination and growth of the best Flowers, Fruits, and Vegetables. A crown of Parsley excited keen rivalry in ancient Greece; and was the sole, but dearly-priced, reward of the victor in the strife for superiority at the great national games. Yet I anticipate the prompt retort that the Greeks were heathen! and had not learned to propitiate Mammon when they let out contracts for the erection of altars to unknown Gods!

A generation has passed away since the Royal Horticultural Society of England was induced by plausible assertions, to form an alliance with the Crystal Palace Commission whereby it became bound to hold its Exhibitions at Kensington, subjecting itself also to other onerous conditions. From that date commenced the decline of the Society's prosperity and the almost complete paralysis of its useful functions. Before, it was active, full of healthy vitality, was accumulating a reserve of funds and possessed troops of friends. Thereafter, it hired bands of music, offered superb displays, catered for the London Four Hundred and, having its labor for its pains, surely, if by degrees, sank into a hopeless abyss of insolvency. Within a few years past it has striven to extricate itself from its entanglement and only recently was it able to discern the first faint gleam of light. Now, it has put the Tempter behind it, confining its efforts to the advancement of Horticulture, pure and simple. It exhibits what it has grown, holding out no meretricious allurements. It plays no more upon a harp of a thousand strings, piping unto those who will not dance! but limits its harmony to the concord which is evoked by common devotion to a consistent, settled purpose. And Fortune is beginning to smile upon it once more. If you ask me why I allude to this episode in the history of a strange society, in a foreign

land, I reply to you Horticulturists of Worcester County! *de te fabula narratur*. Beware lest history repeat itself! You are treading like paths in your Chrysanthemum Exhibitions, pulling chestnuts from the fire for others, and burning your own fingers in futile attempts to rival the ambitious displays by professional Florists, whose trade it is to cater to each whim of fashionable society, which dissipates its languid energies at shows of horse or dog, and spares perchance a moment's thought to the gorgeous, scentless marvel from far Cathay. As such shows cease to be even a nine days' wonder, constituting but a passing fashion, is not our longer participation in them, at a loss which we can ill afford, the merest folly! For culture of the Chrysanthemum, unlike that of the Rose, is not and can never be engrafted upon the common, everyday horticulture of Worcester County. For the advancement of such horticulture—the promotion of the growth by people generally, and not by a special, technical class, of every desirable flower, fruit, or vegetable, was this Society originally instituted. Only by keeping that purpose constantly in mind can the Society be perpetuated with usefulness to the community and credit to its members.

All which is Respectfully Submitted

[by]

EDWARD WINSLOW LINCOLN,

Secretary.

Horticultural Hall,

Worcester, *Massachusetts*,

November 7, A. D. 1894.

REPORT OF THE LIBRARIAN.

REPORT OF THE LIBRARIAN.

Worcester, November 1, 1894.

To the Members of the
Worcester County Horticultural Society.

Your Librarian respectfully submits the following report:

The number of Books and Papers taken out during the year is 376. The number consulted has been large. The past year the Library has been open every day from 8 A. M. to 6 P. M., excepting July and August.

During the year to come the Library will be open every day, Sundays excepted, from 8 A. M. to 6 P. M.

The following Books, Periodicals, and Papers have been added the past year:—

Bureau of American Republics:
Special Bulletin for October, 1893. Coffee in South America.
Bulletins for November and December, 1893.
Bulletin for January, 1894.
Bulletin No. 61. Uruguay. Coal and Petroleum in Columbia.

Bureau of Education:
Report of the Commissioner of Education, 1889 and 1890. Vols. 1 and 2.

Report of the Commission on Secondary School Studies, appointed at the meeting of National Educational Association, July 9, 1892. With reports of the Conferences Dec. 28 and 30, 1892.

Catalogue of the American Library Association. 5000 Vols. for a popular Library selected by the American Library Association, and shown at the World's Columbian Exposition, 1893.

History of Education in Delaware.

Spelling Reform—Francis Marsh.

Statistics of Public Libraries in the United States and Canada, 1893. Weston Flint.

Statistics of Public Libraries in the United States, from the Reports of the Commissioner of Education, 1884 and 1885, with additions.

Ninth Report of the United States Civil Service Commission, July, 1891, to June, 1892.

Reports from the Consuls of the United States. Nos. 158 to 169, inclusive.

United States Department of Agriculture:

Report of the Secretary of Agriculture.

Agricultural Library Bulletins Nos. 1, 2, and 3. Accessions to the Library.

Farmers' Bulletin No. 16. Leguminous plants for green manuring and for feed.

Circular No. 3. An important enemy to Fruit Trees.

Weather Crop Bulletins. Nos. 1 to 10, inclusive. Co-operating with Massachusetts State Board of Agriculture.

Report of Connecticut State Board of Agriculture and Experimental Station, 1893. T. S. Gold, Secretary.

Report of Cornell Agricultural Experimental Station, 1893. Bulletins Nos. 58 to 72, inclusive.

Michigan Agricultural Experimental Station Bulletins Nos. 101 to 112, inclusive.

Rhode Island Agricultural Experimental Station. Bulletins Nos. 26, 27, and 28.

Massachusetts State Board of Agriculture:

Report, 1893. W. R. Sessions, Secretary. 20 vols. for distribution.

Report of the State Board of Agriculture on the work of Extermination of the Gypsy Moth. January, 1894.

Massachusetts Crop Reports. Bulletins Nos. 1 to 6, inclusive.

A Synoptical and Analytical Index of Massachusetts Agricultural Reports, from 1837 to 1892. F. H. Fowler.

Directory of the Agricultural and Similar Organizations in Massachusetts. February, 1894.

Bulletin. Special Fertilization. Prof. C. A. Goessman.

Hatch Experimental Station. Bulletins Nos. 24 and 25.

Special Bulletin. Green Manuring.

Third Annual Report of the Trustees of Public Reservations.

Report of School Committee, Sutton. Sarah M. Mills.

Transactions of Worcester North Agricultural Society. 1894. George Cruickshanks.

Reports of the American Cemetery Superintendents. 1887 to 1891, bound. 1892, 1893, and 1894, unbound. John G. Barker.

Municipal Reports, San Francisco, 1892 and 1893. E. I. Comins.

Report of Dairy Commission, 1890. Henry Phelps.

Department of Agriculture of New South Wales. Nematodes, mostly Australian and Figian, by N. A. Cobb. Edward Procter.

Agricultural Gazette. Australia. 6 months. Edward Procter.

Grand Rapids, Michigan, as it is 1894. Board of Trade.

Hon. J. H. Walker. Speech. No repeal of the 10 per cent. State Bank Tax.

Ventilate the Hall of the House of Representatives.

Report of the Parks-Commission, 1893. Edward W. Lincoln.

Address of Mayor Marsh, 1894.

Outlines of Forestry, 1893, by E. J. Houston, A. M. Samuel H. Putnam.

British Forest Trees by John Nesbet. Samuel H. Putnam.

Errors in School Books. A. A. Pope.

Italian Gardens by Charles A. Platt. Mrs. P. S. Canfield.

How to know the Wild Flowers by Mrs. William Starr Dana. Mrs. P. S. Canfield.

Dictionary of Worcester and Vicinity. F. S. Blanchard & Co.

State Board of Health Bulletin, Nashville, Tennessee, 1894.

Boston Journal of Commerce. W. I. Holmes.

Purchased by the Society:

Curtis's Botanical Magazine. Vol. 49. 3d Series.

Journal of Horticulture. English. Vols. 26 and 27. New series.

Asa Gray's Letters. 2 vols.

Revue Horticole, 1893.

According to Seasons. Talk about the Flowers in the order of their appearance in the woods and fields. Mrs. William Starr Dana.

How to know the Wild Flowers. Mrs. William Starr Dana.

Insects and Insecticides. Clarence M. Weed.

Fungi and Fungicides. Clarence M. Weed.

Trees of Worcester. Miss Arabella H. Tucker.

Insects injurious to Fruits. 2d Edition, 1892. Saunders.

Gray's Lessons and Manual of Botany, 1887.

Silva, or a discourse of Forest Trees and the propagation of timber in his Majesty's Dominions as it was delivered in the Royal Society on Oct. 15, 1662, by John Evelyn, with notes by A. Hunter, M. D., 1803.

Sargent's Silva. Vol. 6.
Insectivorous Plants. Darwin.
On the fertilization of Orchids by Insects. Darwin.
Different forms of Flowers on plants of same species. Darwin.
Cross and Self Fertilization. Darwin.
The movement and habits of climbing plants. Darwin.
Amateur Gardening.
American Florist.
American Agriculturist.
American Gardening.
Country Gentleman.
Garden and Florist.
New England Homestead.
Massachusetts Ploughman.
Meehan's Monthly.
Gardening.
Rural New Yorker.
Vick's Magazine.
Daily Spy.
Agricultural Gazette. Eng.
Garden. Eng.
Gardener's Chronicle. Eng.
Gardening, Illustrated. Eng.

All which is respectfully submitted.

A. A. HIXON, *Librarian.*

REPORT OF THE TREASURER.

The Treasurer of the Worcester County Horticultural Society submits his annual report for the year ending November 2, 1894.

While the receipts from the stores are more than last year, the amount received for rent of Hall has been considerably less, owing without doubt to the very general depression of business.

The insurance on the building and contents, having expired within the past few months, it has been renewed for a larger sum, for a term of three years, at an expense of $1,269.90. Owing to this expense, we have been able to reduce the permanent loan but $500; it is hoped, however, that the general business of the city for the next year, may be so much improved that the receipts from rent of the hall may be enough to warrant a large reduction.

The F. H. Dewey Fund is now one thousand dollars, the income that had accrued having been applied to the purchase of books and periodicals as was intended by its founder. The permanent debt, secured by mortgage on the property of the Society, is $13,900.

The details of the receipts and expenditures have been as follows:—

NATHANIEL PAINE, *Treasurer*,

In account with WORCESTER COUNTY HORTICULTURAL SOCIETY.

DR.

1893.		
Nov. 1.	Balance, as per last report,	$ 156.42
1894.		
Nov. 2.	Receipts to date:	
	From rent of stores,	$6,000.00
	rent of hall,	2,933.00
	membership fees,	115.00
	temporary loan,	985.63
	chrysanthemum exhibition,	130.00
	sale of tickets to reunion,	136.00
	Dewey Fund, for purchase of books,	169.45
	interest on deposit,	38.50
	Total,	$10,664.00

CR.

1894.		
Nov. 2.	Payments to date:	
	By city taxes,	$ 626.24
	water bills,	34.27
	temporary loan paid,	1,000.00
	paid on mortgage loan,	500.00
	paid to judges,	150.00
	insurance premium,	1,269.90
	premiums paid exhibitors,	1,741.13
	for coal,	295.28
	gas bills,	655.20
	interest on mortgage loan,	720.54
	on account of repairs,	172.74
	books and magazines,	116.35
	salaries,	1,549.96
	A. A. Hixon, expense at hall, including janitor,	745.02
	printing and advertising,	309.64
	sundries,	18.25
	on account of Reunion,	228.74
	Total,	$10,133.26
1894. Nov. 2.	Balance of cash,	530.74
		$10,664.00

THE F. H. DEWEY FUND.

1894, Nov. 2. The balance of this fund, after transferring the interest received to the general account, for the purchase of books and periodicals, is $1,000, and it is on deposit in a Savings Bank.

Respectfully submitted,

NATHL. PAINE, *Treasurer.*

WORCESTER, Nov. 5, 1894.

The undersigned hereby certify that they have examined the account of the Treasurer, and find the same to be correct and properly vouched, and the cash balance is accounted for.

HENRY L. PARKER,
F. H. CHAMBERLAIN, } *Auditors.*

TRANSACTIONS

OF THE

WORCESTER COUNTY

HORTICULTURAL SOCIETY,

A. D. 1894-95.

PART II.

Worcester, Mass.
CHARLES HAMILTON, PRINTER,
311 MAIN STREET.
1895.

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WORCESTER COUNTY
HORTICULTURAL SOCIETY.

10th January, A. D. 1895.

ADDRESS*

BY

Hon. HENRY L. PARKER, President.

Before proceeding to the topic which I have chosen for discussion, I desire to congratulate the Society upon the successful work of the past year. While it is true that financially the Society has not escaped the effects of the general business depression, yet in exhibitions, in the interest and enthusiasm of its members and the influence of its work upon the general public, as manifested by the largely increased attendance upon its weekly displays, there has been a marked advance over all previous years. Especially noticeable were the displays of the foliage of rare shrubs, shade and ornamental trees, and wild flowers in their season.

This is a new feature in our exhibitions, but that it has already won the popular favor is manifest from the attention and study which these collections attracted from visitors. It is a feature which should receive encouragement, for it is in line with what President Hall (in his speech at our recent banquet) claims should be one of the missions of this society, viz.: To cultivate and bring back a renewal of that love of nature which is inherent in every human breast, but which the congestion of our cities and large centres of population, the associations and ways of metropolitan life, have a tendency to efface.

*Written out from recollection by request of the Committee on Publication.

Our Society may also feel proud of the fact that one of our members, Prof. Joseph Jackson, has published during the past season a book which will be appreciated by all lovers of nature, "Through Glade and Mead." While its style reminds one of Burroughs and Thoreau, and every page breathes an invitation to the woods and fields, it contains also information of great value. Its classification of the flora of Worcester County, the most exhaustive which has ever yet been made, should give it a place in the library of every student of botanical science.

But my purpose to-day was to speak upon the subject of "Fruit Growing in the Annapolis Valley"; and by the Annapolis Valley I mean, of course, the region known by that name in the Province of Nova Scotia.

More by accident than by design, I spent a few days in this region last summer. In the Annapolis Valley lies the scene of Longfellow's "Story of Evangeline or the land of Acadia." But the whole Province was anciently known as Acadia, and in the old geographies of the French it is described as a barren, inhospitable, almost uninhabitable region, extremely cold, and fettered for a good portion of the year with ice and snow. But either the old geographers made an egregious mistake, or the temperature has become most wonderfully modified since those old days: for although the latitude is that of Northern New Hampshire and Vermont, all the fruits which flourish with us (except, perhaps, the grape, which can only be grown in favored localities), ripen there in abundance and perfection; all our varieties of pears, peaches, plums, as well as all the small-fruits, —strawberries, raspberries, currants, gooseberries. I said to them, "How can you do it? How can you raise all these fruits with your low temperature and fog?" But they said, "We have no low temperature. It never reaches zero more than once or twice during the cold season and never goes more than seven below, and we have no fog. You see those mountains?" (A range of mountains extending along the coast for twenty miles to the northwest and called the Colbequid or North Mountains). "Those protect us from the northwest gales and the sea-fog. You see some mornings the fog rising over the tops of the

mountains and curling over a little and then receding. It never comes down into the valley." And the words of Longfellow in "Evangeline" came at once to mind,

> "Aloft on the mountains sea-fogs pitched their tents
> And mists from the mighty Atlantic looked on the happy valley,
> But ne'er from that station descended."

And it was indeed a happy valley—the people thrifty, intelligent and contented, as we might expect when we reflect that the larger portion of them are of New England stock; for after the expulsion of the French Acadians, the country was settled by colonists from Massachusetts and Connecticut. And the soil possesses a fertility surpassed by few other spots on the continent. There are several square miles of dyke land, reclaimed from the sea, with a soil from six to eight feet in depth of a rich loam. This dyke land has produced for generations, and without the application of any fertilizing material whatever, from one and a half to two tons of hay to the acre. The loam itself is used as a fertilizer. It is carted to the upland during the winter months, and as a mulch for trees is preferred by many to the best barnyard compost. The staple crops are hay, oats and potatoes. Three hundred bushels of potatoes to the acre and fifty bushels of oats to the acre are not uncommon.

Fruit growing, however, is the principal industry. Raspberries are produced at the rate of five thousand quarts to the acre.

Plums grow there in perfection. I noticed there nearly all the varieties grown with us,—the Lombard, the Washington, the Bradshaw, the Gages,—and every tree loaded to its utmost bearing capacity.

Fruit growing is not only the principal industry but everything else is subordinate to it. It is the principal topic of discussion. The very air seems filled with an afflatus from the orchards. The greatest interest centres, of course, in apple culture; as the apple, from its foreign market, is the source of the greatest revenue. And if in the culture of the apple the orchardists of the valley have achieved success, it is because they have earned and deserved it; because they have pursued it with

an energy and persistence which has amounted to enthusiasm. The land is first highly fertilized for the orchard and the trees well planted. After planting and while growing, the trees are constantly kept mulched and the soil stirred up. Crops of buckwheat and other cereals are sown and then ploughed under as fertilizers. The trees are kept pruned as they grow, and as they come into bearing condition they are looked after with unremitting attention. In the early spring the trunks are washed with soaps, those of the older trees being scraped.

The foliage is sprayed with kerosene emulsions and Paris green. Search is made for borers; and with the first blossoming the pruner begins his work. The fruit is thinned as soon as set; and from the first putting out of the foliage until the fruit matures, the orchard is visited with spade and pruning saw.

The result of this care was seen in fair, perfect fruit, and a bright, healthy foliage.

The apple growers of the valley claim, that for fine flavor and in keeping qualities, their apples beat the world. The first claim I think is not sustained by facts.

A collection of choice samples was sent to the Massachusetts Society a few years ago from the Association; and that Society reported, that while conceding them a first place in keeping qualities, yet in flavor they were second to Massachusetts apples. But it is certain that no apples sell better in the London market than the Province apples. They command a higher price than apples from the States.

But few varieties are in general cultivation. Those found the most profitable for cultivation are the Gravenstein, Ribston (an English apple), King of Tompkins Co., Blenheim, Golden Russet, Fallawater and Nonpareil. The Gravenstein is the general favorite. Ask any apple grower to name five or more best varieties for general cultivation, and his list will always begin with the Gravenstein. The Nonpareil is a long keeper. It has been shipped to London in the last of May in perfect condition and sold there for over two pounds per barrel; the same apples have been taken to Paris and retailed at ten cents an apple. The Nonpareil is a small, compact apple, and allowing say six hundred apples to the barrel, it yields you $60.

Other varieties cultivated are the Baldwin,—which is getting out of favor, because some years it does not color up,—the Rhode Island Greening, the Alexander and the Yellow Bellflower, which is better known there under the synonym of the Bishop's Pippin.

It is without doubt largely due to the skill with which the Province apples are packed, that they command such prices in the foreign market. Great attention has been paid to packing and transportation.

The Province of Nova Scotia some twenty-five years ago, boasted of a flourishing Agricultural Society. Sometime in the early seventies a Fruit Growers Association was organized, having its headquarters in Wolfville, in the Annapolis Valley. This Association has usurped the place of the Agricultural Society, and the latter has become, in the valley at least, practically defunct. The Fruit Growers Association is the live Society, and it has accomplished a great work, not only in exciting an interest in fruit culture, but by means of discussions, lectures, and papers, in teaching the best methods of culture. An outgrowth of the Fruit Growers Association is a Horticultural School. An endowment or appropriation has been made for the purpose by the Dominion Government. A large tract of land has been leased for a term of thirty years for experimental purposes. A corps of professors and instructors have been engaged, and during the coming year a building is to be erected.

The moral of what I have been saying is, that granted a good soil, and proper care and attention, good apples can be grown; and the application of this moral we can take home to ourselves.

Worcester County lies in that portion of Eastern Massachusetts noted for the fine flavor and qualities of its fruits; and especially in the flavor of the apple, to no other section of the country or the world does Eastern Massachusetts yield the palm. No other section of the world of the same size has originated more apples in general favor for cultivation than Worcester County. And if our farmers and orchardists would devote to apple culture the same energy and attention they give to market garden-

ing and the culture of small-fruits, Worcester County could beat the world in this industry.

We *do* raise fine apples. No finer apples were ever seen anywhere in size, in color, in flavor, and in all those points approaching perfection, than were exhibited in our Hall during the past Autumn ; but for every plate thus exhibited how many plates there were remaining of imperfect, worm-eaten and worthless fruit, is a question of serious consequence, to be answered only by conjecture. If I were to hazard a guess, the rates would be not less than three to one. Good judges have placed it as high as eighty per cent.

The trouble is, that our farmers and orchardists do not make apple culture a serious business. Instead of making of it a real business, they make it subordinate and auxiliary to something else, and very much auxiliary at that. And if they persist in going forward in this indifferent fashion, in planting their trees carelessly and caring for them still more carelessly, leaving them to fare as best they may in soil poorly prepared and poorly fertilized, unpruned, untouched by wash or spray, a prey to the borer, the codlin moth, the canker worm and caterpillar, and when the fruit is gathered, fill the barrel with good, bad and indifferent all together, and in this condition palm them of upon an unsuspecting public, what right have they then to complain that there is no money in apples? "Do men gather grapes of thorns or figs from thistles?"

Ex-President Hadwen has well said, that in the line of fruits, "the apple is the richest gift the Almighty has vouchsafed to man." It is in more universal use than any other fruit. It can be used in its natural state during a longer period of the year than any other. Its medicinal and sanitary qualities are unsurpassed. And the demand for good apples is constantly on the increase. The foreign market is year by year asking for a greater supply. One grower in Middlesex County has shipped to England the past season, from his own orchard, over two thousand barrels. But for poor, imperfect, indifferent fruit there is no demand, and no market at home or abroad, and never will be.

In this connection, it is interesting to note that certain gentlemen from different parts of the State, specially interested in fruit culture, have in contemplation a Convention in our Hall sometime during the present winter, to consider the organization of a Fruit Growers Association. As Horticulturists, we ought to welcome the advent of such an Association, for it would be in a line with the aim and purpose of our own Society. If organized, it will not be the first kindred society that has seen its birth in this Hall, nor is its mission likely to be the least in usefulness. While such an organization and our own would both feel that they were travelling the same road, yet each would have its own special work,—the one esthetic, the other practical; the one dealing with the question of economics, the other occupying broader ground and ever keeping in view the advancement of horticultural science in all its branches: but each would inevitably help and stimulate the other. The stimulus to apple culture of such a movement cannot be overestimated. We bid it "God-speed."

17th January, A. D. 1895.

ESSAY

BY

O. B. HADWEN, Worcester, Mass.

Theme:—A Century of Pomology.

I am asked to give some recollections of the pomology in New England for the past century. It may not be becoming for one who has lived but three-score years and ten, to attempt an elaborate history, or to delineate the vast progress that has taken place during this period of time.

The early settlers inherited and brought with them the innate fondness of, and the necessity and value, that the garden and orchard contributed to their sustenance and good living; as early as 1621 Edward Winslow speaks of native grapes, strawberries, gooseberries, and plums; records of tree planting come down to us, for, in the year 1648, Peregrine White, the first man born of English parentage in New England, planted the first apple tree, which outlived several generations of men, and is described as a giant of its kind.

The pear tree imported from England by Governor Prince, and planted by him at his homestead about 1640, was described in 1836 as a flourishing tree, when two hundred years old, and then bearing fifteen bushels of fruit a year.

Another pear tree, still standing in Yarmouth, was planted in 1640. Besides these trees, many others planted by the first settlers before 1700, are yet standing, and a still greater number since the commencement of the present century; and while the trees are represented as strong and vigorous growers, the fruit was but of inferior quality, as judged by the present standard.

Many trees of the Hightop Sweeting, still growing in Marshfield, Mass., are reputed to have been planted more than two hundred years ago.

The first apple having originated in New England, that has proved a great favorite, and been widely disseminated over the whole country, is the Rhode Island Greening, having its origin on the island of Rhode Island, in the town of Portsmouth. The original tree stood near an ancient tavern known, in 1765, as "Green's Inn," and for many years it received the appellation of "Green's Inn Apple," it becoming a favorite with the travelling public that stopped at the inn, and was early disseminated over the State and country.

Among other seedling varieties were the Foxwell, Pignose, Bachelor Button, and Pearmains, which, having lived their allotted time, have passed away to make room for the newer and approved sorts now so generally grown.

In the earlier times, the land being new and rich in all the elements requisite for tree growth, the accumulation of ages, trees did not require or receive the care in their cultivation necessary at the present time.

John Josselyn, who styled himself a gentleman, made several visits from England to this country, in 1663, describes fruits growing in New England of the apple, pear, cherry, quince, plum, and barberry trees, and has observed that trees raised from the seed or stone produce fair and good fruit, without grafting, and the country is replenished with fair and large orchards; he also speaks of one Mr. Woolcot, a magistrate in Connecticut Colony, who affirmed that he made five hundred hogsheads of cider out of his own orchard in one year; he did not state whether said Woolcot was drunk or sober, or if it was much of a year for cider, either. George Fenwick and John Mason, of Saybrook, Conn., as early as 1641, are reported as growing the apple, cherry, and peach. The fruit of an apple tree which was given to the Apostle Eliot, with an acre of land, by the Indians, was exhibited at the Massachusetts Horticultural Society in 1833, called the Orange Sweet. Another apple tree imported from England, and planted in the garden of the Wyllis family in Hartford, before 1650, produced fruit in 1822. These interesting relics tend to prove the apple to be long-lived when grown from the seed, as was the custom in the earlier times.

Among the pears of ancient origin, and are interesting relics, are the Orange Pear, planted about 1640; the Iron or Black Pear, said to be more than two centuries old; the Pinneo Pear, of Connecticut, said to be one hundred and sixty years old. An Orange Pear tree, described by Chief Justice Paul Dudley, in 1726, that measured forty feet in height, and six feet six inches in girth a yard from the

ground, and has borne thirty bushels in a season, some specimens measuring eleven inches around the bulge; he also describes a Worden Pear tree measuring five feet six inches around; and one of his neighbors has a Bergamot Pear tree, brought from England in a box in the year 1643, that measures six feet around, and has borne twenty-two bushels of fine pears in one season. The pears grown in the latter part of the last century, and known as St. Michel, St. Germain, Brown Beurre, Virgoleuse, were undoubtedly introduced by the Huguenots, about the year 1685; and it is from these that our earlier native pears have sprung. Cherries and peaches also received some attention early in the seventeenth century. Some cherry trees, planted in 1650, at Bristol, R. I., lived two centuries.

Peaches are mentioned by William Penn. Writing the 16th of the eighth month, he mentions very good peaches, and not an Indian plantation was without them. Peaches were grown from the stone in 1790, by John Kenrick of Newton, Mass., who planted a quantity of peach stones; the process of budding was not then understood or practiced, and trees were grown in their natural state; with this practice, peach trees were long-lived and attained great size, bearing abundant crops in a few years. Subsequently inoculating or budding was practiced, and about the year 1818 the dreaded disease known as "Peach Yellows" was first noticed in the State of New Jersey; a few years later, large quantities of choice varieties of peach trees were brought into New England from New Jersey, and with them the "Yellows" was introduced, and has since remained, and probably will continue so long as budded trees are used, or trees grown from stones procured from diseased trees.

The attempt to prolong the existence of choice varieties of peaches, which is done by budding, has, without doubt, had a tendency to lessen the natural stamina of the peach to that extent that they are unable to withstand the extremes of temperature in this climate, as they formerly did when grown naturally. It is also well known that the "Yellows" does not manifest itself in trees grown under glass, or in the southern portions of the country; hence, we may conclude the peach in its weakened condition cannot resist the disease in our climate. Therefore, the "Yellows" has been the main cause of seriously diminishing our peach growing, almost to the extent of prohibition. It would also seem the only course to pursue to regain our former success, is to root out all the old trees and plant anew with stones procured from sections of the country where the "Yellows" is unknown.

Thus, it will be observed that our starting-point in pomology is directly traced to the early settlers, who brought with them the love of fruit growing, and, although for nearly two centuries progress and advancement of pomology was comparatively slow, it was no less firmly rooted, and its rapid and continuous advancement spread over the whole country; the practice, the science, the art of pomology, had barely dawned in the beginning of the present century, and orchards were quite in contrast with the intelligent and judicious care they receive at the present day; the career of the pomologist was yet in its earliest stages, but his eye has been turned upward and onward—his labor unremitting.

No man in the beginning of the nineteenth century seemed, or even regarded himself, a true American of the higher type, who did not plant fruit trees, and, although it was after the war of the Revolution and after the war of 1812 before fine orchards and gardens became numerous, small-fruits began to receive cultivation in the gardens of the wealthy, and wild berries only were sold in the markets; we had just commenced to develop the resources of our great country, which embraces every clime and every variety of soil adapted to the cultivation of fruits, both indigenous and exotic.

Even this brief sketch of pomology in New England would be incomplete without some mention of the Societies, both Agricultural and Horticultural, together with the papers and periodicals treating of agriculture, stimulating the introduction of fruits, and treating of the better modes of cultivation; one of the earliest works published in New England, its title "Essays upon Field Husbandry," by Rev. Jared Elliot, of Killingworth, Conn., begun in 1747, but barely alluding to fruit culture. But Elliot introduced into Connecticut the White Mulberry, and wrote a treatise on the mulberry tree and silkworms.

"The New England Farmer," by Dr. Samuel Deane, was published in 1790. "The American Gardener" was published in Washington, D. C., in 1804. "The American Practical Gardener" was published in Baltimore, in 1819. A "Treatise on the Cultivation of Flowers," by Roland Green, was published in Boston, in 1828; and numerous other papers have aided and encouraged pomology.

The first efforts for promoting agriculture by societies was the formation of the "Philadelphia Society for Promoting Agriculture," in 1785; and "The Agricultural Society of South Carolina" was incorporated in 1795. The "Massachusetts Society for Promoting Agriculture" was incorporated in 1792. It was the pioneer of agricul-

tural societies in New England, and was very active in encouraging all interests pertaining to fruit growing in New England. "The Agricultural Repository" was published by this society, being the first of its kind in the State; a writer furnished a list of twelve peaches, six cherries, seven apples, and fifteen pears, being considered the most esteemed grown in the State at that time.

The "Roxbury Russet" was included in the list of apples. It probably had its origin in Roxbury, Mass. Soon after the settlement of the country the first settlers of Stonington, Conn., went from Roxbury in 1649, and tradition states, took this apple with them at a very early date. It is undoubtedly the oldest of the native sorts and has been widely disseminated over the northern portion of the country.

The "Baldwin," at that time, was but little known. The original tree stood in the town of Wilmington, Mass., and first fruited about the middle of the last century. It is now probably more extensively grown than any other apple in the New England States, and as a commercial apple for export outranks all other sorts.

We have, as briefly as possible, alluded to the cultivation of fruits as existing in New England previous to the war of 1812. After the termination of the war, fruit growing seemed to receive a boom. From England, France, and other European countries the best varieties were sought out and brought into New England; and with the ardor that new things receive here, orchards and gardens were planted with the best fruit then known, but much inferior to the choicer productions of our time, many being "to the manner born." I remember when the choicest apples found in our markets could be counted by less than a dozen sorts, and pears and peaches equally limited; when strawberries were gathered from the meadows and pastures. I have gathered bushels and sold them at fourpence-halfpenny per quart. I cannot learn that previous to 1824 strawberries were cultivated in gardens, but a little later were occasionally found in the markets.

I planted my first strawberry bed in the spring of 1836,—two sorts, the Alpine and Early Virginia. I believe the following year added the Methuen Castle, then a new English sort. In 1838 the Hovey Seedling was first shown at the Massachusetts Society, and in the words of the Committee, "promised well." I purchased two plants in 1840, at twenty-five cents each, and made money with my investment. Very soon after, numerous varieties seemed to spring up all over the country, and the cultivation of the strawberry was fairly established as a market industry. Hundreds of esteemed varieties

have been brought out, have lived their allotted time and passed away to make room for others still to come. From a limited garden industry, the cultivation of the strawberry has increased to thousands of acres, and the season of fruit from Florida to the Provinces is continued fully three months. It would seem, from observing the newer sorts from year to year, that the limit of perfection has been already reached, many of the new seedlings being inferior to some that have passed away; but a new seedling that promises well always enlists the warmest attention of growers, and it is soon put upon its merits; and when soil and cultivation are favorable very many have proved decided acquisitions. The Hovey, Wilson, Boston Pine, Scott's Seedling, La Constante, Brighton Pine, Jenny Lind, Triomphe de Gand, and four hundred others, have been esteemed varieties, but now are unknown, except by name.

The raspberry, following the strawberry, adds a favorite fruit for home use and the market. The best sorts are of foreign origin, or seedlings from them; they are proving even more desirable for cultivation. They are long-lived and seem almost perpetual. The older sorts remain as good as ever, and are only replaced by newer kinds that promise better in flavor, productiveness, hardiness and size of berry. They are not as extensively cultivated as the strawberry, but early in the century only wild raspberries were in use, indigenous and growing all over New England. The older sorts were the Antwerp, Herstine, Hornét, Northumberland, Kneivett's Giant, together with the Black Caps, which form a succession of berries until the blackberries are in season.

Blackberries, in early times, were growing wild, more especially on newly cleared land, and when once rooted were continued in pastures and on the roadsides. The wild sorts were both high bush and trailing; the trailing were the earlier and larger fruit. They were so abundant in earlier times that they were not much cultivated until within forty years. Since that period the cultivation of the blackberry has, and is now, largely increased. Many new seedlings have been brought out and widely disseminated, proving great acquisitions and well worthy of cultivation, affording a continuous season of small fruits until the grape becomes ripe.

The grapes found growing wild by the Puritans were quite distinct from European sorts. Within the last fifty years increased attention has been given to them in New England, and many hybrid varieties have been introduced through cross-fertilization. These are proving a wonderful success. It requires an early grape to succeed in New

England, and cultivators esteem earliness as one of the requisite features to ensure annual and well-ripened crops; and, while the vineyards are not a leading feature, a large area is devoted to its culture.

The pear, although found in very limited number early in the century, made but slow advances. The Seckel pear, according to Downing, was known in 1765. It was introduced to cultivation before 1817. The original tree, in 1848, was very large for a Seckel, being more than six feet in circumference at one foot from the ground. I saw the tree about the year 1863; it then showed evident signs of decay. It was the first native pear that attracted much attention and for many years was regarded as the standard of excellence.

Probably the first attempt in this country to produce a new fruit by cross-fertilization was by William Prince, who raised Prince's St. Germain, about 1806. Thus it would seem the pear, until within fifty years, received but little attention outside of gardens, and even then but few and inferior sorts. The first impetus given to its cultivation was about 1835, and the better sorts of foreign origin were introduced about this time. There was increasing interest manifest and many good kinds were imported. Horticultural societies, with their exhibitions and liberal offers of premiums, with the fondness of Americans for new and rare things, soon brought from abroad hundreds of varieties.

The sessions of the American Pomological Society brought together large collections at their exhibitions in Boston in 1873. Messrs. Elwanger & Barry contributed three hundred and seventeen finely grown varieties of pears. Marshall P. Wilder, the President of the Society, contributed four hundred and four varieties, comprising all the foreign and native varieties. Hovey & Co., of Boston, contributed three hundred and twenty-eight varieties, and F. & L. Clapp had eighty-six varieties of pears grown from seed. There were more than six thousand dishes of fruit, from all parts of the country, including Canada and Nova Scotia.

At this exhibition it would appear as if the pear cultivation had arrived at its height. Only nurserymen and those of great wealth and enthusiasm could attempt such displays. Soon after it was discovered that fewer kinds, comprising the choicer sorts, were more to be desired, and the weeding out process was in order. The great mass of poor and ordinary kinds were thrown out and their cultivation discontinued.

We have now arrived at a more healthy condition in pear culture. But few varieties are grown, and those that are found especially

adapted to the soil and climate of the grower; and, as a rule, they are not, when grown for market, found as remunerative as the apple, but afford an agreeable family and dessert fruit, well suited to a refined taste, and in season eight months in the year.

In the main, however, I believe the experience of the last forty years of pear cultivation in New England will not warrant large orchard industry, with the sole view of profit; the greater portion of our people are unaccustomed to use pears as freely as they use other fruits, and the supply is often found greater than the demand; its tendency often to rapid decay, is also against it.

By far the most important phase of pomology is the apple, and, without any hesitation, I will affirm the best fruit God has given to man.

Fortunately, New England lies within the great apple-growing belt, ranging from the Atlantic to the Rocky Mountains, and it is still more fortunate in the exquisite flavor of New England apples. I have never seen them equalled, and I believe I have travelled over this country from the St. Lawrence to the Gulf, to and from the Atlantic to the Pacific.

The soil and climate of New England is even more favorable to the production of the apple than of the pear, plum or peach.

During the past sixty years the apple has been more largely planted in orchards than all other fruits combined, and the supply for home use and export, from year to year, is enormous.

There have originated in New England many apples of the most approved varieties; they are largely grown here, and have disseminated over the whole country, Downing's Fruit Books recording over three thousand kinds of apples, fifty-five of which have their origin in Connecticut, more than eighty in Massachusetts, fifteen of these in Worcester County, and undoubtedly many more that have not found their place in printed works.

The other New England States have also contributed a large number that take a first rank throughout the country.

At the Exhibition of the Massachusetts Horticultural Society in 1829, apples were barely mentioned; and at the first Exhibition of the Worcester County Horticultural Society in 1840, but few apples were designated by name.

Since that period the apple has made most remarkable advance, its cultivation being stimulated by Agricultural and Horticultural Societies and State Boards of Agriculture in all the New England States.

Previous to the formation of these societies there were but few

orchards that were managed with much skill, and very many received but haphazard treatment.

As time went on, knowledge and science slowly crept in; every season brought out more improved cultivation and better products, and in a few years horticulture and pomology were recognized as the fine and higher arts in rural life and rural aptitude.

Equal progress has been made in inculcating an educated taste for choice fruits and creating a demand which encourages the cultivator to supply fruits which fill the markets with tempting displays from all parts of the country.

The thousands of acres of orchards and gardens which may now be seen in New England manifest the strangest contrast with that in former years, and for many years New England was in advance of other portions of the country in horticulture.

The natural conditions which govern our soil and climate require more skill and brain in its manipulation to ensure success. Special manures and fertilizers are found to be a necessity; the art of grafting and budding, with other approved modes of propagating, have to be acquired and made use of; judicious pruning is one of important practice in the orchard; and thinning the fruit, to promote size and good flavor, is equally necessary.

It would seem, if we may judge from the new fruits of the last fifty years, there is no barrier to obtaining by hybridization fruits of any desired size, quality or color, if the proper knowledge is used with a requisite amount of skill and patience, to produce almost any desired size or quality, together with fine aroma and brilliant coloring.

Science has revealed these possibilities, which only await the skilled cultivator to demonstrate in all the lines of fruit growing.

New England is also favored with a variety of soils which is found favorable to the growth of the apple. Experience also teaches that one kind of soil is not adapted to the growth of all kinds of apples; some thrive best in a loamy soil, some in sandy, others in a gravelly or clay; keeping those things in view, it is plain that several varieties of apples, when planted in a single orchard, are more reliable for a crop, as seasons come and go, than one variety.

Sometimes climatic conditions prove injurious to one or more varieties, when others in the orchard are uninjured.

In the earlier times, and even now, there were and are, many theories not well founded, relating to orcharding; of late years growers are changing their views, and the majority of orchardists endeavor to understand the reason of their practice; under these conditions

the march of progress has been rapid, and success is in proper ratio to the care the orchard receives.

I have, for some years, given more especial attention to the growing of apples than to other fruits.

In the autumn of 1843 I planted the apple-seeds from which the trees in my orchard of twenty acres are planted, budded the trees, and planted them, and have watched their progress of growth and bearing ever since. The trees are now at maturity and bear full crops, and I have received a vast amount of pleasure and a reasonable amount of profit from my husbandry.

When we look back upon the past century and notice the vast changes in pomological pursuits that have taken place; the rapid progress made in all its phases; the general diffusion of knowledge of fruit growing; the vast increase of gardens, vineyards and orchards within every State and Territory, from the Atlantic to the Pacific, unequalled in extent of acres, of capital invested, in any country in the world; the great variety in all classes grown; the general and rapid dissemination of valuable fruits, either old or new; and in looking at past and present progress, and draw upon the imagination to estimate future advancements, now that the principles that bring out, by cross-impregnation, new sorts so rapidly, and will continue in all time,—we feel we cannot correctly estimate the future; we know not where our successors will stand, or the perfection their knowledge, their culture in fruits will attain a hundred years hence. But if we may judge by the past, we can feel encouraged that the science of pomology will be upward and onward; new discoveries are sure to be made, new principles of cultivation will be brought out, and we cannot even conceive to what perfection in pomology our successors will achieve and develop.

But marvellous as the progress of the next century may be; however great may be the advancement; how much it may add to the beauty and charm of rural life, and men will repose amid the bloom and fruitage of the orchard and vineyard,—we may at least congratulate those of the present century who by their labors and zeal have contributed to this heritage, and given the advantage of the clear and steady light which will illume the future toward pomological perfection.

It has been my privilege to have personally known, and to have been associated with, some of the noted men who have been leaders of pomological interests for nearly a half-century; some of them have been instrumental in raising from seed, and introducing some of the

prominent fruits now known and cultivated; among these notable men are the Downings, Wilder, Warder, Barry, Downer, Bull, French, Hovey, Clapp, Manning, Moore, Kenrick, Prince, Buck, Hunnewell, Parkman, Sargent, Strong, Smith, Berckmans, Hyde and Gold, with many others who have and will leave enduring monuments of their good and noble work, which will continue from generation to generation.

I have alluded but briefly to the progress of Pomology in the past and present century,—to elaborate would extend this paper far beyond reasonable limit of time, and tax your patience in undue proportion to the information imparted.

Much as has been accomplished in Pomological industries, still greater achievements and accomplishments await those who may follow.

The yearly fruitage awaits generations of men for all time, and will ever be in just and due proportion with the intelligent labor bestowed.

24th January, A. D. 1895.

ESSAY

BY

HERBERT R. KINNEY, Worcester, Mass.

Theme:—Vegetable Gardening.

It being but two years since I had the pleasure of reading a paper before this Society on this subject, and at that time we looked at it in a general way, it may be as well to-day to consider some varieties of vegetables individually, and incidentally speak about some of the many things that are always coming up which make gardening one of the uncertain, if not the most uncertain, branches of agriculture.

During the past two years, which have been years of business depression throughout the country and which we have felt to a certain extent, we have also had two exceptionally dry summers; but for all that, as we look about us, we can see others that are getting along no better, in the many branches of industry that go to make up our generally very busy city and county. And while we, as gardeners, horticulturists and farmers, could wish for better business, we must remember that we should only expect a reasonable share of the good things that labor can provide, and our business gives many that some others are denied. We will not try to consider this matter now, but turn to the literal meaning of our subject.

I shall not try to follow any particular line in this paper, but take up some of the more common vegetables in a more or less general manner, and leave many loose ends for discussion later should you wish to spend more time on this subject.

In vegetable gardening, fertilization is one of the first subjects to be considered, and on very light or very heavy land it is desirable for us to have considerable vegetable matter. This vegetable matter or humus is quite necessary in most soils, and the easiest way those living near the city can get it when they wish to get a large part of their land under cultivation, is from stable manure: but where one has

land enough so that it is not necessary for him to have more than from one-third to one-half of his land under cultivation, there is then no trouble keeping his soil well supplied with vegetable matter without drawing heavily of manure; in which case it becomes desirable to ascertain the relative value of agricultural chemicals, mixed fertilizers and stable manure to see which will produce, not always the largest crop, but rather the one that is the most satisfactory, everything considered.

Quality, I am sorry to say, does not count for as much in our market as it should, not that we do not now have to grow as good vegetables as people wish to pay for, but most people buy by the eye, and many things that look very good are not of the best quality, and people after buying a poor thing a few times will decide that they don't care for it, and stop buying, which is not what we want. It is better to have a good sale at a reasonable profit, and that is a small one at this time, than to have a limited sale at a much larger profit.

Another thing that should be considered by the gardeners is some way to have the vegetables reach the consumer in better shape than they do at the present time. This is a point that we as vegetable growers are not apt to give as much time and attention as the matter deserves.

We are very liable to consider that when they are sold to the dealer and we have received our pay for them, that it makes no difference to us whether the dealer is able to sell them or the consumer able to eat them; but here we are making a mistake; we should not only try and put them up in such a manner that there should be the least possible loss to the dealer, but so that they should be in the best possible condition when they reach the consumer.

I will not at this time even suggest a remedy for the present careless handling of vegetables, but any of you who chance to be about a market, especially during warm weather, can see that there is need of better handling; and there is not a doubt but what it would be as much of a benefit to the growers as to any one.

When we come to look at this subject in the line of individual vegetables, varieties, methods of growing and handling, etc., it is rather difficult to decide just where to begin, and I shall not try to treat the subject, but just take up some of the standard varieties.

Of the whole list of vegetables there is not, perhaps, one of more importance to the gardener than lettuce. You may think differently, many of you, as there are many who only think of lettuce as a salad a few weeks during early summer; but when you consider that at the

present time lettuce is a standard vegetable all the year, and the large amount of capital that is invested in sash and houses largely for the growing of lettuce, you can see that it is a very important crop for the gardener. It is important on another account, as it is a crop that he can grow during the winter; and that is quite desirable for those who do not keep cattle, at any rate.

It seems to be the general impression at the present time that greenhouses are preferable to sash for the growing of lettuce during the winter; but as I have had no experience with them can not judge, but would say that we have had no trouble in growing very satisfactory lettuce under sash during the last three winters. It has always seemed to me as though there was more trouble in raising good plants than in growing the lettuce.

In running sash during cold weather we find it desirable to put in a few sash of heat at a time, and arrange so as to be able to put in a few sash in a bed as often as possible, as we cannot hold much heat during the short days in winter long enough to grow a good crop; but a few sash of fresh heat put in from time to time seems to help quite a long run; and while it is more trouble, you might say, perhaps, that trouble is what we are looking for when we try to raise lettuce during the winter; because it is not how many sash can a man look after, but how can he make a day's pay; and I would rather spend a day's time on two sash than four, providing we can get the same returns.

Our market is not a good one for winter lettuce; but if the time comes when we can raise good lettuce so that it can be sold for from 5 to 8 cents per head, during the winter, there is but little doubt but what the demand will increase. While the price is very high at present, there is no reason to expect another such a time for a number of years, during which time there will probably be considerable lettuce raised at a loss.

Fungus has begun to make its appearance in some places in such a manner as to cause uneasiness, and if the gardeners were to have their own way about it, we should know but little about its habits until it got so destructive as to threaten the industry, as they, the gardeners, are as a rule, non-believers in fungi; but I am thankful to be able to say that there are students studying these small plants, and we may hope, at least, that they will discover some method of holding them in check.

Lettuce delights in a rich, mellow soil worked deep, and does not need much water either in sash or outdoors when the weather is cool,

but as it becomes warmer it will use considerable. The only variety that is wanted in the market here, is the white seed tennis ball, or one of the strains of big Boston, during the winter.

When it comes to summer or outdoor lettuce there is probably nothing that gives as good satisfaction as the black seed tennis ball.

During the summer lettuce grows quite readily, but owing to its keeping so poorly, both in the field and in the market, it is not used very extensively; and then we have many summer vegetables that do not last long that call for our attention.

Cucumbers are another of the gardeners' standard early crops. They are mostly grown in beds and houses, when the weather becomes so warm the glass is no longer needed for growing lettuce, and as they require more heat than most vegetables, are a desirable crop to have under glass during hot weather. They will generally do fairly well in a lettuce-house in early spring, but it is generally considered that it is about as profitable, with sash particularly, not to start them until the weather gets warm. While the later ones do not sell so high there is generally a better crop.

When not troubled with disease they will continue to bear nice cucumbers a long time, but of late there has been much complaint, both here and in the eastern part of the State. There seems to be only one variety that is desirable to raise for market under glass here, and that is the white spine, some strains of which are very fine. They are also the standard variety for planting out in the field where slicers are wanted, but are not good for pickles, as they do not set so much fruit as some of the smaller varieties and are not so good shaped when small. The standard variety for pickles for this market is the Boston pickling, where the demand is mostly for small and medium pickles. Pickles do best if planted after the 20th of June, and are usually early enough if planted the first week in July.

Cabbage is another of our vegetables that we have most of the year, and that are in the market all the time. Early cabbage can well be called a garden vegetable, but the later ones are more of a farm crop. It is very probable that there are more cabbage raised and sold than of any other vegetable, potatoes excepted, and in many places they are considered a very profitable crop.

Early cabbage has always seemed to me to be, as one of our largest gardeners once told me they were with him, "The most uncertain crop I grow." When they do well they are a very nice crop to handle, as they are easy to keep free from weeds and leave the ground in fine condition for a late crop.

To get good early cabbage, it is very essential to have good plants, as their principal enemy is the maggot in the root, and strong plants will often get through when weak ones are destroyed. Club-foot is the disease that gives the growers of late cabbage much trouble, especially if they are on low ground.

The standard early varieties here are the Early Jersey Wakefield and Henderson's Early Summer. The Winningstadt is becoming a popular cabbage for summer and autumn, and while it may be a desirable cabbage for the dealer, I hardly think it profitable for the grower, as it is quite small. It has until quite recently sold for considerable more than the drumheads, and it ought to, but of late some of our large cabbage growers have been growing it quite extensively, and if it can be grown nearly as cheap as the drumheads, it will probably be the standard summer and fall cabbage. The Stone Mason is a standard winter cabbage and much better for this market than a larger variety. The best strains are round enough so they trim well during the winter. It is a good keeper.

Early cabbage thrive best in rich and not too moist old garden soil, that has not had any of the cabbage family grown on it for at least three years, while late ones enjoy nothing better than a good sward; but they are rank feeders and need heavy manuring. Cabbage grown on, or partially with, fertilizers and chemicals, will keep better than if grown exclusively on stable manure, and they will keep better if grown on sward than if grown on old land.

Cauliflowers are treated very much the same as cabbage and usually sell for more by the head, but the demand for them is very light in this market. They are one of the many vegetables that are not appreciated here.

Perhaps after cabbage there is no vegetable so important with the gardener as the beet. This is also a vegetable that we have practically the year around, although there are so many shipped here from the South during the early spring, that there is not so much demand for old beets late in the season as formerly. Some gardeners have done considerable of a business with transplanted beets, especially in southern New England; and while it does very well if they can be brought into market a few days earlier than those sown in the open field, it is usually hard to get them early enough so that they will clean up before there are a plenty from the open ground, when they will not begin to bring what they cost, and do not sell as well as those grown from seed sown in the open field. Beets will sometimes come nicely if sown when the ground is quite wet and cold, but are

generally more satisfactory if not planted until the ground is pretty well dried off.

It is quite important that beets that are intended for extra early should be well thinned, after which they need but little attention. The standard early beet for this section is the Egyptian, and it is a good beet early in the season, but soon becomes hard and of poor quality.

For a general purpose beet, there is probably none better than the Edmands; but that has most too heavy a top and is too much of a beet to be sold for the price they were last summer. They come at a time when the gardeners are not heavily loaded, and are a good vegetable, and perhaps we should consider that we are doing something for the poor. We certainly cannot be doing much for ourselves when we sell good bunch beets for from 20 to 25 cents per dozen. The best winter beets are grown when the seed is planted quite late. From the middle of June to the middle of July should grow them of good quality, and they keep better to be stored before very hard freezing.

The Egg Plant is a vegetable that, while there is very little demand for them in our market, are worthy of a better standing, as they make a very nice dish when well served, and are quite easily grown, but the people here have not got used to them yet. They are started and grown about the same as tomatoes.

There is hardly a vegetable that is more universally grown by both large and small gardeners than the tomato, and while the season of the fresh fruit is not a long one, it is very extensively used during its season. One of the reasons for its general use is that it is easily grown and usually gives a good crop. They are one of the vegetables that will grow on most any soil and are not generally subject to disease, although there are one or two diseases that are occasionally quite destructive to them. For a very early crop they may be set on dry land that is not rich and set quite close (2x3 ft.), but where the land is in good heart and moist, four or five feet apart each way will be close enough. There are three types of tomatoes extensively advertised, but only one in general cultivation here. They are represented by the Atlantic Prize for extra early, Acme and Perfection for general crop, and Ponderosa—very large. There are a good many varieties of each of those types, especially the Acme and Perfection, and there may be some improvements on them which were some of the first of this class.

Of all the late crops in the vegetable garden celery is king, and since

the general introduction of the self-blanching varieties, so-called, its season has been very much lengthened, as they can be had in good condition by the middle of August and are on the market much earlier; but celery does not come to its best quality until the weather becomes cool, and seldom is in prime much before Thanksgiving. The height of the season is from that time until after the first of January, when it begins to drop out of general use, and while the price generally advances there is apt to be much more waste.

Celery is generally considered a second crop, but on moist land, where it is difficult to put in a crop early in spring, it is becoming quite common to set Paris Golden or White Plume in rows from five to seven feet apart in June, and later set in Giant Pascal or Boston Market between. During the months of September and October the early is to be blanched with boards and taken out, and then the late celery banked; in theory this is one of the best methods of growing celery on moist ground, but I can say from experience and observation that it does not always work as well as we might wish. Celery is a very rank grower in cool weather if it has plenty of moisture, but does not do well generally on dry land unless artificially watered. It does best on land that has been in cultivation a number of years and that has been worked deep, and it seems to do well on the same land year after year.

The best celery is usually grown where the seed is sown where it is to grow, but as it germinates very slowly, is very small and grows slow for a long time after breaking ground and is very liable to burn off, it is generally as easy to start it in the bed, where the seed is generally sown about the first of April for the general crop; for very early it is put in a little earlier, but if planted too early it is liable to run to seed.

Plants set after the first of July will usually make the best celery to keep, as it is much less liable to disease and is much finer grained than what grows in warm weather. It can be used to follow any early crop and does nicely set between every other row of early cabbage if the cabbage are cleared away carefully and the ground thoroughly worked, but the land must be rich and in good condition or it will not be a satisfactory crop. I have had very good luck setting it after strawberries, but the land must be rich and thoroughly worked. I should not think of trying a crop of late celery without using fertilizer liberally. In fact, we seldom plant any crop without using fertilizer, and the more manure we use the more anxious we are to get a second

crop, and if a few bags of fertilizer will push the crop a few days earlier and make it of better quality, it pays well.

DISCUSSION.

Mr. S. H. Record. *Mr. President*,—I notice the essayist spoke of lettuce and the possibility of growing it so that it would be cheaper in the market than it has been. I would somewhat question that possibility after some seventeen or eighteen years' experience in growing it, from the fact that it costs some five or ten times as much to grow it under glass as to raise it under open culture; but we may have to sell it cheaper. When we do, we will diminish our greenhouses and diminish the crop growing; that has been practically the case this year. We have been adding greenhouse to greenhouse until this past year. While it was said by some of the market gardeners when they went to Arlington, they could hardly find a man at leisure to talk with them because they were so busy building so many greenhouses. This year they have hardly raised any lettuce. Ten years ago I made up my mind that the South would very soon knock us out on lettuce growing. During the last few years, however, we have not had much competition from the South. Down there they have grown it chiefly in Florida. Last winter when I was in Philadelphia, and also the winter before, there was a great amount of very fine lettuce shipped from Florida, and it was shipped in such quantities as to knock the price down so that it was hardly worth while to grow it under glass; and that has been discouraging some of our northern greenhouse growers. Mr. Budlong, who is one of the largest gardeners in New England, has five or six greenhouses, and two or three hotbeds besides, containing lettuce. He went to Florida about a year ago, and he said he came back as sick a man as he ever saw; and I felt just so myself when I went into market in Philadelphia, when I was there last winter. He said he was not going to build any more greenhouses. But you know near the very last of December we had a frost that destroyed all the oranges and lettuce in Florida. Now we began to ship to Philadelphia, and our first lettuce met the Florida lettuce there. One man had various vegetables valued at $45,000. He had $42,000 offered him on Friday for what he had in his garden; on Saturday he said he would have taken forty-five cents for the whole of it. Now we have letters from Philadelphia wanting us to send all the lettuce we can every week; they say even if it comes there Saturday, the day they generally don't like to have it come, they want it. Many of our greenhouses here have not nearly the

amount they generally have to supply the want, now that the Southern crop is cut off; but that is an exception here in New England.

In regard to the difficulty of growing it, I wanted to speak of one or two points which Professor Goessmann gave us here last week, that we have not always understood, on various fertilizers and conditions of the soil. There is great difficulty in growing lettuce by artificial heat at this season of the year; the days are so short and the nights so long that it is extremely difficult to grow it without its becoming diseased. There are various fungoid diseases, some of which we know and some we do not know, which will sometimes nearly ruin the crop after it is almost ready to ship.

Professor Goessmann explained to us, when the soil was lacking in potash, how we could tell it. That was the reason of the rotting of the lettuce at this time of the year.

Some are growing it by electricity; he thinks it is a benefit. I know that a plant will grow better under electric light than it will around the corner of a building where the light don't shine.

Mr. Budlong, one of the largest growers in New England, said, "You may perform the same operation as to planting, temperature, culture and watering and all that, and you never will get the same result twice alike in lettuce growing." One man told me after he had grown lettuce forty-five years that he thought it was only mere luck and chance, where he grew four crops a year he only got about one good crop once in four years. This is not showing a great deal of ability. In regard to other vegetables, I presume there are others who will have more to say.

Mr. Stevens, of Wellesley. *Mr. Chairman*,—I have been especially interested in the very practical essay of Mr. Kinney; I admire the ground he has taken in making quality the leading point. I am not much of a vegetable grower, devoting more of my time to small-fruits, but he has said several things of which I heartily approve. Among others, that on account of the intelligent criticism we meet in the market of New England, they require a first-class vegetable put up in first-class style. We must turn our attention, I think, in fruit culture, in flowers and in vegetables, to perfection in quality as well as size.

Mr. Kinney spoke of celery, the Prince of plants in the vegetable family, so wholesome, so nutritious and so desirable that I hope our tables will be supplied with it at every meal possible. He also spoke about the new fancy kinds, the beautiful foliage almost equal to flowers. My attention was once very strikingly called to that in a trip I

took to Canada. I went into a restaurant at Toronto, beside me sat two sons of the Emerald Isle; after giving my order I reached over and took a branch of the beautiful White Plume. One of them cried, "O Mike, Mike, watch the lad ateing the bouquet." Such a plant as that I think should be encouraged as much as possible.

I also find in the cauliflower another delicious plant. I have always loved Peter Henderson, who introduced the White Snowball cauliflower. If we grew a few less cabbages and a few more nice, early cauliflowers it would be more profit to the grower. Potatoes, tomatoes and squashes will always be in the market. We can improve in quality, size and color.

It is well that the seeds which are sent out by our congressmen can be sent to the experimental stations to be tested before they are put into the hands of the growers. I hope that this good work will go on; and from the hands of the persons who conduct the Worcester County Horticultural Society, one of the first in the land, we may hope for good fruits. May success attend their efforts.

Mr. Charles Greenwood. *Mr. President*,—I must certainly express my appreciation and pleasure for the paper that was read by Mr. Kinney. He has expressed my ideas very well in the general tone of his paper in regard to the varieties of the market. I notice one thing in his paper, one departure from his usual line, in regard to fertilizers. We all know what to expect from the Kinney family, the senior or the junior. They advocate the commercial fertilizers; but in the paper to-day I gleaned that they are not wholly given over to their exclusive use but recognize the value of the use of stable manure. In regard to that, it depends very much on the soil as to which shall be used. In my own case I find that stable manures are more satisfactory, and I shall probably use less of the commercial fertilizers this year than I have in any previous year. I shall, however, this year, use the special fertilizers for potatoes with no stable manure. But the majority of my soil being rather moist, it needs a mechanical action of the coarse manure to lighten the soil; and on such soil I don't think the application of the chemical would be at all satisfactory without vegetable matter, which the stable manure affords.

Question. Won't you tell us why you use more stable manure?

Because I think I can better afford to use that.

Question. Is it for cheapness or for quality?

I might say, for both, being as near the city as I am, it is better to have the team at work and drawing the manure at the price I can obtain it than pay out the money for the commercial fertilizer; but I am

satisfied that on the most of my soil it wouldn't give the best results. I know that with a liberal supply of stable manure I seldom fail to get a satisfactory crop.

Mr. Frank J. Kinney. *Mr. Chairman*,—I think Mr. Greenwood is getting old, the same as myself; that is a very broad statement he made. The older I get I believe the less I know. When I first began to talk before this Association I thought I knew something about growing vegetables, but now that I have heard so much, I begin to think that I don't know anything and never shall. Just as I think I have learned something about the working of the ground some one else steps in with his new ideas and entirely overturns mine.

I don't think I can add anything to the paper that you have heard and the remarks that have been made, unless it is that five years ago the fact appeared that it was a great deal cheaper to use special fertilizers than to pay the enormous prices which we had to pay for stable manure. Since we began on fertilizers we have had the advantage; I can better afford to haul from the city at $1.50 a load the same as I used to pay four and five dollars a load for. It makes a vast difference, and I am a little afraid that it will affect my neighbor on the right a good deal, as well as myself. I don't do it because I think it is better myself, but because I think it is cheaper. We must produce goods so that we can sell them cheaper, and still we must keep our quality up. There are lines of goods that we cannot sell in the winter, lettuce and other vegetables that are not eaten because people think that they cannot afford to buy them. Now we have got to learn to produce them cheaper. There is no doubt but what we can save a large per cent. on help if we are judicious. We can get better help. The help question has been the greatest drawback. I have often had my attention called to the fact that so very few have been brought up in the business. By the time that you have got a man so that he is good for anything, somebody else wants him and will pay him better. Now we have learned that we can take some classes of foreign help that will learn better and that will do better work than the American help that we have been fishing for. All we have got to do is to keep our eyes open. I would rather have one good Swede that will work at a good price, than to have any American man I ever saw.

Mr. David Fiske, of Grafton. Thank you, Mr. President! I don't think I can enlighten this company any in regard to raising vegetables. The more I do the less I know. I believe that my experience has generally agreed with the essayist as far as I know.

I never raised any lettuce under glass. I don't quite understand why there should be any wrangling about raising lettuce. I plant lettuce in the early spring, when the ground will work, and it grows. There is no trouble about its growing, I grow it just as easily as I grow grass. Now there is one thing that has not been touched upon, perhaps because it is not exactly a market-garden crop, and yet it is, and that is turnips. Now I have tried a great many times to raise early turnips, but have never succeeded in getting anything that is good for anything. Last year I had a piece of new ground that had not been ploughed up for forty years to my knowledge. I trimmed all of the trees that were there after I had ploughed it, and got quite a heap of brush on top of the furrows. I burned that over, which left a good heap of ashes; then I put on some phosphate and sowed some black turnip seed. The turnips came up and they grew, and I thought they were going to be good; but when we came to eat them they were not good for anything, they were as poor a lot as I ever raised, although I noticed that there were good early turnips in market. In regard to Rutabaga turnips, I have raised some that were first-rate. I planted them about the middle of July; they did not come up until after we had a good smart shower in August; they grew finely, and they cooked splendid. The year before, when we cooked them they were black inside and strong. I don't know enough to know why I have good ones this year and last year didn't have good ones. I raised them very largely on phosphate this year, and I did when I had black ones. I had, perhaps, a half-acre and I put on some privy manure and I don't know but what they were just as good and perhaps a little better there; they grew a little larger than anywhere else. I had a little bit of experience last year with cauliflowers. I have raised splendid ones. Last year I got some early plants and I set them out, and then I cultivated them. They began to head out pretty soon and they got a head as big as a silver dollar, and then they stopped. I don't understand it, so you see I don't know anything about raising cauliflowers. Onions is another crop that has not been touched upon; I have always until this year had good luck with onions. Last year I had a piece of old ground, and also a piece of new ground, side by side. I had fertilized the whole piece with stable manure, and I harrowed it in and ploughed it thoroughly, and I put on about a bushel of wood-ashes to the square rod, then I put on a pretty fair dressing of superphosphate, and then sowed onions, four kinds of beets, several kinds of carrots, lettuce, parsnips, etc. All the parsnips did splendidly, and the

onions came up pretty well, but for some reason they didn't grow, and then I got some nitrate of soda. I had an idea that that would hustle them. It generally does with crops; and I put it on the onions and took considerable pains to keep the weeds cut. I have found a good deal of trouble in regard to help. They most all of them want to let them alone until they can get a good strong hold. I find it almost impossible to get anyone who will go through a row of onions and leave it as it ought to be left. There will be weeds left. Well, I took care of these onions myself; but the onions didn't seem to grow as I thought they ought to, so I put on some more nitrate of soda and phosphate, and right beside them, the beets grew splendidly; but I never succeeded in getting the onions to any size. If anyone knows how to raise onions, I wish he would tell me.

Mr. F. J. Kinney. *Mr. President*,—This statement of Mr. Fiske reminds me of the trouble one of my city customers had last year. He had quite a little garden, so as to have something to do. I was going there every three or four weeks, and wondered why he didn't ask me to look at his garden; but as he was a very deaf man, I didn't think it worth my while to interfere. Well, it kept along until everything grew smaller and smaller, and one day he asked me to go into the garden. I went, and after looking around a little he asked me what to do to make the vegetables grow. Well, he had gone through about the same process as Mr. Fiske, only in addition, he had taken out everything that looked like a stone. Well, I says, "I should hate to tell you, my friend, but you have done everything except to give them a little water, and that is what they need." For the next three months he had streams of water running through them, and they grew beautifully.

Has Mr. Fiske anything to say about water?

Mr. Fiske. I didn't have any.

Mr. S. H. Record. I hope anybody here who intends to plant a garden, won't rely for a moment on any seed which you get from Washington. It may be good, and it may not. I often think of a remark our Secretary made once of a lady who was exhibiting flowers; she came to him and told him she had got some flower seeds from one of our Congressmen. She was very much elated to think that she was complimented enough to have some sent to her, and he did not understand, but after he had got it fully in his mind, he said, "Well, I hope you are not going to risk your reputation by planting them." It is the same about vegetables, if our President has ordered them to be tested at our experimental station then it will be all right to use

them, but I should advise every one to have them tested first. Just one word in regard to help,—Mr. Kinney said that the difficulty was, that the help didn't know anything; now I have found it just the opposite; they know it all. Nearly twenty years ago, I guess, my man was hauling manure here in the city, when a man stopped him and asked if he wanted to hire some help. He replied that he didn't, that he was a hired man himself. "Does your boss want to hire anybody?" "Why, yes, he wants to hire a man that can grow lettuce under glass." "Well, what is that?" "Well it is growing a plant they call lettuce under glass." "O yes," says he, "it is grown the same as anything else, I know all about it."

Mr. Wm. O'Connell. *Mr. President*,—I haven't got anything to say of value. I was just listening to see if I could pick up something to cure the diseases of those vegetables. I think it is about as interesting a lesson as we could learn from a meeting like this, to give us a remedy or some plan of action to do away with the diseases and the ravages of the bugs and worms that attack the vegetables. I presume all the market gardeners that know all about the secret like to keep it to themselves. And I would like to know what to do with cabbages that are club-footed or how to do away with the green worms, or how to do away with the maggot that attacks the onion. Now if any one will answer either of these three questions— Mr. Kinney. I will say right here, that a week from next Saturday, I am scheduled to read a paper on fungi. Now I am not prepared to say anything.

Mr. O'Connell. I would say that I raised onions for the last five or six years, and had very good success. I generally put them in as early as the ground is ready to work, and I put on stable manure. I get it all around the neighborhood and get it for taking it. I believe that stable manure is about as good as any that you get. Fertilizers I have tried of course, they are good to start up the crops early, but have a tendency on certain soil to make the soil heavy and damp. I had an experience with onions two or three years ago. The year before that, I had a little experience with parsnips. They were immense; in fact, they grew too long. I had some that were almost three feet long. I thought I would leave some in there until spring, and then dig them out fresh; but this year we had a good deal of snow on the ground, and there was no frost before the snow came. After a while the snow all went off, leaving the ground open and filled with moisture, and the consequence was, in the springtime the parsnips were all rotten. I ploughed up the ground and sowed onions where the parsnips were, and I had the finest onions I

ever saw. Some of them would weigh one pound. They were thick. I don't believe in thinning out onions too much, because they will push each other out of the ground. The ripest ones will come out of the ground first, and they will go to market first; and then the others will come in later, when you need them. My idea of telling you this is, that I think that the parsnips made a fertilizer that suited the onions. I hear a great deal about sowing clover; I suppose it is on the same principle, the rot goes into the ground and forms a fertilizer.

Mr. James Draper. I don't know as you want to hear from me. I don't know anything about vegetables; my friend, Mr. Hartshorn, here, can tell you a great deal more in that line than I can. However, I will take one moment. I don't think we want to encourage those onions of our friend O'Connell, that will weigh a pound. When we commence to work the scaling down of size, and scaling up of quality, I remember the indignation of our friend Goodwin, who hired a truckman to bring up a good load of enormous squashes, that all came from one vine. He expected enough money in prizes to pay the expense of bringing them, and he was very much provoked because I did not award them the prize. Also, our Mr. Pond, who brought in some spinach, one plant of which was large enough to fill a bushel basket, and he was very much surprised to think that we did not encourage that enormous growth. I believe that is one of the best things this Society has been doing, the scaling down size and requiring an exceptionally fine quality.

Mr. A. E. Hartshorn. *Mr. President*,—In regard to cabbage, if I could see any signs of disease, I would watch the plant and treat it with kerosene emulsion; that is the best remedy that I know of for cabbage.

Question. Kerosene emulsion with milk?

No; that I spoke of was mixed with water and sprayed onto the plant. That will almost always fix the green worms.

I would like to ask this brother who had trouble with club-foot, if he grew the cabbages two years successively on the same ground?

Mr. O'Connell. Yes, I did, and I had trouble with plants that grew on new ground. They grew club-footed during the season.

Did you raise your plants or did you buy them?

I bought some, and I raised some. I found both affected.

Mr. O'Connell. About the maggot in the onion. I always find they come up very good in the beginning, but when they are about five or six inches tall, the trouble begins. Now this is a disease that

is often fatal to onions, and I lose about half the crop; but, then, I generally have a very good crop, because I don't believe in thinning out until I see that all danger to the plants is out of the way. Now there seems to be a certain time of the year for this maggot to work which lasts about two or three weeks; after that time is past, the onion seems to grow all right. I see that some recommend letting an onion patch that the maggots will injure, rest two or three years. That is the only cure for it. The onion will grow on the same land every year better than any other crop. They seem to be better on the same land if not attacked by disease.

Mr. Watts. I suppose it is a well-known fact that cabbages cannot be grown on the same land, on stable manure, two years successively. Cabbage is a plant that, if it is planted on new land, will never be troubled with the maggot; it may, however, grow stump-rooted.

Now anyone who likes cabbages will surely like Brussels Sprouts, and how much better it would be to grow fewer cabbages and more Brussels Sprouts. They are delicious and go far ahead of cabbages; in fact, they will do better than cabbages.

Question. You mean if you get good Brussels Sprouts?

I don't ever have any trouble in getting good ones. I certainly should grow Brussels Sprouts in preference to cauliflower. I only raise a little cauliflower for pickles.

Now I would like to move a vote of thanks to the essayist, Mr. Kinney.

Chairman. It is moved that the Society give a vote of thanks to Mr. Kinney.

Mr. Fiske. *Mr. President*,—As long as the question of club-footed cabbages is up for consideration, I can say I have had a little experience in this line. I set out to raise some very early cabbage, and I got early plants and set them on a piece of ground that was ploughed the August before, and it was mellow and in good condition. We put on quite a large amount of stable manure and set out the plants sometime in April. They grew finely, then after awhile they looked wilted, and I found that they were getting stump-footed. I happened to see in a newspaper that soft soap poured around the roots would save the plant, and I got a few gallons of soft soap; I put, perhaps, a teacupful of soft soap around the roots, and then covered it with dirt, and whether the cause of the stump-root had got through working, or whether the soft soap saved the plant, I don't know,

but the biggest part of them brightened up and grew, and were a splendid success.

Question. What was the quality of the cabbage?

They were good cabbages, they sold well, that is the test.

Speaking about big onions, Brother Draper thinks he don't really like the big onions. Now he would be pleased with my onions. They had more quality than size.

The Chair announced that the next meeting, on Jan. 31st, would be addressed by Mrs. A. E. Henderson.

31st January, A. D. 1895.

ESSAY

BY

Mrs. A. E. HENDERSON, Worcester, Mass.

*Theme:—Incidents of Foreign Travel.**

While our fair land is wrapped in the white blanket of winter, and our rivers are silent beneath their icy sheets, let us turn our faces southward to a land of perpetual fruit and flowers.

Amid a world of waters, the beautiful island of Barbadoes appears, green with the growing sugar-cane and dotted with windmills.

How lovely it appears to our eyes which so long have looked upon ice and snow! We sweep into the harbor of Bridgetown and anchor amid a fleet of whaling-ships which chance to be lying here. Immediately we are surrounded by small boats, whose black occupants clamber on board in such numbers that I retreat into the cabin and gaze through the windows, astonished at such audacity. When ordered to leave by the officers, they express their determination to remain. There being ten to one of the crew, it was useless to make any disturbance with them. Each one was clamorous for the chance of carrying some one ashore in his boat. As in the case of certain advertisements for help, the supply was more than equal to the demand. We were told afterwards that they actually drowned one poor passenger. He wished to go on shore and got into one of their boats, but another boatman claimed him and pulled him into his boat, and still another claimed him, until the poor man lost his life. Before I went to Barbadoes, I was a strong abolitionist, but I found myself wavering somewhat when the black natives took possession of our floating home, and disregarded all authority. Finally the harbor-police boat appeared in sight, together with the crew from one of the whale-ships, and we got rid of our unpleasant visitors.

It is only the newly arrived ship that is troubled with them. Barbadoes is one of the most important of the British possessions in the

* A. D. 1869—70.

West Indies. It is twenty miles in length by twelve in breadth. The population is very dense, there being as many inhabitants in proportion to its size as there are in China. The blacks fairly swarm. The island is sometimes visited by hurricanes. Some years ago it was swept by one of these terrible storms in which thousands of the inhabitants lost their lives, and a vast amount of property was destroyed. Barbadoes may be called a sugar island, it being almost exclusively devoted to the cultivation of that article, large quantities being annually exported.

We visited several fine plantations and were much interested in the process of sugar-making. The cane is cut from the field with huge knives as we cut corn-stalks. It is then taken to the mill, where the juice is extracted and the boiling process is commenced. It is boiled in large iron basins, and from the skimmings of the syrup West India rum is manufactured. After being boiled sufficiently and cooled, it is shovelled into hogsheads having holes bored in the bottom, through which the molasses drains into an enormous cistern beneath the unboarded flooring. When the molasses is all drained, I have seen half a dozen negroes going from one hogshead to another tramping the sugar with their bare feet. Recently a machine for packing the sugar has been invented. The natives are very fond of chewing the sugar-cane before it is crushed; you can buy it anywhere in the markets.

Sugar is one of the most unpleasant cargoes on board ship on account of the steam which arises in the hold. It sometimes turns the white paint in the cabin a grayish color.

Trinidad is a large island situated on the northern coast of South America near the Orinoco River. It is nearly as large as Porto Rico. The same animals are found here that are found on the mainland of South America. We entered the Grand-boca of the Gulf of Paria, where we passed an English man-of-war which returned our salute, making a pretty picture as she steered between the wooded islands which formed the mouth of the gulf. We beat up the gulf and anchored off Port of Spain, the capital of the island.

Here we heard, for the first time, of the famous Asphalt Lake, which is reached from the Port of La Brea. This lake of pitch is considered the greatest curiosity in the West Indies. It is unlike any other lake in the world; for you can walk upon its surface, although from a distance it resembles water. The atmosphere is very unpleasant and people who are obliged to live near it are troubled with ague.

We were invited to dine at the consul's home. His sons were fine

musicians and were Protestants, the same as their father, while the daughters and their mother attended the Catholic Church. After spending a delightful evening we walked to the beach, where we found our boat waiting to convey us to our floating home. Every dip of the oar sent up golden showers of phosphorus, and when we arrived on board the whole ocean was sparkling with every movement of the waves; a phenomenon which is frequently seen in the tropics. The singing which floated over the water from a man-of-war made the scene more enchanting. It seemed as light as day, and I brought a Bible on deck and read a verse without any difficulty, although the print was fine. There are fine museums here which contain specimens of the native birds with their wonderfully brilliant plumage. The public gardens contain every kind of tree which grows in the tropics. I was greatly interested in viewing the wonderful variety. The clove tree, with the ground covered with cloves, which were of a red color before they dried, was a wonder to me. I had never thought before how they grew, and picked one or two bunches to preserve as a curiosity. The tree is quite tall, with dark green leaves. The nutmeg tree is very beautiful. I picked up the nutmegs from the ground, which was covered with them. They are covered with a dark, brown shell, outside of which is the mace. Then comes a covering like our walnuts, which they sometimes preserve. The tea has a small white blossom with yellow centre. The cinnamon tree we robbed of a specimen of the outside bark; the inner bark is what we use for spice.

The tamarind tree with its long, brown pods containing the refreshing acid fruit; the vanilla vine with its clusters of vanilla pods; the pepper vine; the guava fruit; the pomegranate; shaddock; and countless varieties which we had never seen or heard of,—greeted us on every hand.

At Point Icaque we took on board our cargo of cocoanuts. The surf is very high here all of the time. We rowed as near the shore as we could and were then carried through the surf by the natives to avoid being wet.

We can look through the glass and see the mainland of South America, from whence small boats come around us laden with various articles for sale. We bought some parrots and a macaw, which is a large bird of most beautiful plumage. The jigger is very plentiful here and one must be careful about going with bare feet. We were invited to dine with the owner of the cocoanut plantation. Before I left the table I was made very uncomfortable by a peculiar sensation

in my foot. After dinner I remarked to the planter's wife that something was the matter with my foot and I could not stand it any longer. She invited me into her room, and upon examination exclaimed, "You have a jigger in your foot, a bad one," and very dexterously cut it out with a penknife, much to my relief. There are miles of cocoanut trees here. The plantation we visited contained a grove of 12,000 trees. They grow to a height of fifty or sixty feet. The leaves are fifteen feet long, shaped like a fern; two leaves are shed annually. They droop gracefully from the top of the trunk, the nuts being in a cluster at the base of the leaves. The natives go up like monkeys and slash off the nuts with a knife. The cocoanut palm thrives well near the salt water. The nut is a great traveller, and finding a resting-place on some reef with only a little moisture, germinates and grows into a graceful tree, affording food, utensils and numberless aids to man. The nut, before it is ripe, is nearly all milk; and the natives never think of eating it when hardened, as we have them here. They drink the milk and eat the soft nut with a spoon. They use cocoanut oil made from the hardened nut.

Dominica is said to be the loftiest of the Antilles. Some of the mountains are volcanic, sometimes discharging burning sulphur. The springs possess medicinal virtues; some are hot enough to boil an egg. Rosewood is common in the forests. Honey and wax are abundant. Roseau is the capital. We entered Prince Rupert's Bay, and anchored off Portsmouth, where we procured a quantity of yams and bananas. The yam is a good substitute for the Irish potato. When the paring is taken off it is white. We found it very palatable, prepared like mashed potato. It is not sweet as many imagine. The tubers are of enormous size, weighing several pounds each. The song says "The yam will grow." I don't think there is anything in the potato family that can beat it in size.

The next morning, after we had anchored in the bay, a boat came alongside containing two boys who had run away from a whale-ship; they begged us to take them home, but before we could make any arrangement with the poor fellows the police-boat hove in sight and they were taken back to the whale-ship. They had had enough of the romance they had read about in dime novels, but they must finish the term of service for which they enlisted.

The island of Haiti presents a beautiful picture. It is a range of mountains rising from the sea. The smoke curling upwards here and there, which we noticed as we drew nearer, was caused by the burning of brush by the natives. The meaning of the word is the land of

high hills. It is separated from Porto Rico by the Mona Passage. The mountains are between nine and ten thousand feet high. It was here that slavery was first introduced on this continent. For nearly a century they have had their freedom, but they have utterly failed to demonstrate to the world their capability to govern themselves. They are fast relapsing into barbarism. We were told that cannibalism was actually practiced in the interior of the island; a fact which we could readily believe. Darwin must have travelled in this island when he became convinced of the origin of his ancestors. The monkeys had a more civilized look than some of the native Haytians. It is said that they are less civilized than the blacks of Central Africa. The white man here cannot own any land except through his black wife. They cannot vote or hold office. In Jacmel, the richest merchant's wife was as black as the stove. Some of his children were white and some were black. It was wonderful to see how carelessly the native women would walk along with a large tray of cakes and fruit upon their heads. They would also carry kegs of water. We walked into the country and saw them half-clad, standing in a shallow stream, thrashing the garments upon rocks, which speedily wears them out; so that one must be well supplied with linen when travelling where washing is done in this primitive fashion. The little children were playing by the wayside untrammelled by the useless article of clothing.

The black men will do anything to get rid of work; lie, steal or live upon the earnings of the women. Our custom-house officer was a black man; and, in the absence of the captain, he stole one hundred and fifty dollars in gold from a desk in the state-room, which was carelessly left unlocked. It was useless to look after him, as he left the place; and with such a princely sum for that climate, where little clothing is needed and where nature has provided abundance to eat, he could live in luxury for a long time.

Nature has done everything for this island. The luxuriance of the tropical vegetation is something that cannot be comprehended by one who has not seen it. The laborer is repaid with three harvests a year. The tall trees are filled with blossoms of every variety and color. Those which are not flowering trees are a support for various climbing plants, which unfold their fragrant blossoms to adorn the tree. In a land so full of bloom the wild honey is abundant. This is truly a land flowing with milk and honey. The bad government, however, keeps the white man with his enterprise from its doors.

The beautiful oleander, with its huge bunches of rose-colored blossoms, claimed our admiration, and carried us back to childhood days,

when we admired the oleander in the window-garden and listened to the following story: "When Hero's lover was washed ashore by the waves she buried him under an oleander tree, where she was accustomed to sit and mourn. A traveller chancing to pass was attracted by the rare beauty of the flowers, and inquired the name. Hero was so absorbed with her grief that she could only repeat, 'O, Leander! O, Leander!' The traveller, thinking she had told him the name of the flower, wrote it down in his note-book."

The firefly is very brilliant. I could read by its light, moving it along beneath each line. I was told that the natives use them for lanterns.

The Rio de la Plata, or silver river, is the widest river in the world. At Montevideo the width is sixty-two miles. At Buenos Ayres ships can now lay alongside the wharves to discharge cargo. Formerly they anchored several miles from the city, and were at the mercy of the dreadful pampero winds, which occasionally sweep across the treeless plains. The seasons here are just the opposite of ours,—June 21st being the shortest day and December 21st the longest. The climate is very fine and the winters mild. The streets are laid out regularly. You can take a street-car, or tramway as it is called there, and soon reach the plains, which stretch away for miles and miles, where the cattle roam wild. The half-civilized life of the cattlemen causes them to consider one who cannot throw the lasso over the horns of a wild animal as effeminate. In the city you find cultivated people of all classes from Europe and North America. We attended church and found a large congregation of people from North America.

We visited the museum, and were greatly interested in the various animals which inhabit the forests of South America. There was an enormous boa-constrictor, stuffed and festooned on one side of the hall. It was as large round as a water pail, and I did not find it hard to believe that they could swallow an ox. I should rather not meet one alive. We took on board a cargo of hides and wool, and half a dozen live sheep for food. A few years ago the cholera broke out in Buenos Ayres and created a panic. The dead bodies were carted off in cart-loads, and sprinkled with lime and burned. In Mendoza, one-half of the inhabitants were wiped out by cholera. Rosario, on the Parana River, suffered terribly. There is no better climate anywhere; but the sewage of so large a city was in a dreadful condition, and Buenos Ayres had to learn a lesson.

The island of Cuba is 660 miles long. It is the "Queen of the Antilles," and furnishes one-fifth part of the world's sugar. The

Havana lottery is conducted by the government and infatuates all classes, from the poor washerwoman to the millionaire. I was told of a colored man who drew a large fortune and suddenly found himself surrounded by a myriad of friends who were all anxious to assist him in spending it. His habits became most aristocratic, and his money and friends melted away as quickly as they came. The hotel-keeper's wife in Matanzas told me that she drew five thousand dollars.

The rainy season lasts from May to November. It pours so hard that you cannot listen to conversation. During the hurricane season the islanders sometimes have frightful experiences. A lady who was in Matanzas during one of these storms, told me that the water rushed over the city at such a rate that the people who were caught out were washed down to the harbor. Ropes were stretched, which some caught and were saved; others were rescued by the ships whose anchors held, and many perished. While Matanzas was flooded, all the water was swept out of the bay of Cardenas. The stanchest ships afloat are sometimes left high and dry upon the shore; the houses are upset; trees are uprooted, and general destruction prevails.

While in Matanzas we rode in a volante, which is a kind of chaise, with very heavy and high wheels and long shafts. One horse is between the shafts, another is hitched to the left side. It is a very comfortable carriage in which to travel over the rough roads of Cuba. As you walk along the streets, you can look into the rooms and see the ladies engaged with their fancy work, etc. They have no need of glass windows to keep out the cold, but have shutters or blinds which are closed at night.

In Sagua la Grande the town is a little distant from the wharf, and the captains were obliged to take the train back and forth. They always rode in the first-class car, while the American Consul took the third-class. One of the captains asked him why he rode in the third-class car. "I ride in the third-class car," he replied, "because there is no fourth-class." One could not but admire such independence. Our government does not provide a very liberal allowance for some of its consuls, and they are obliged to practice the most rigid economy and get what they can from travellers. West India rum is so plentiful here that the sailors are always begging to go on shore. One evening two were granted permission to go. Sometime during the night, we were aroused by the news that the two were overboard; in trying to get on board they had both fallen into the water. All hands turned out to rescue them, and soon I heard them tossed upon deck like logs of wood. Those two did not go on shore again.

Those who have enjoyed the delightful experience of a visit to the tropics appreciate the educational value of time spent there. "The tropics are nature," says James Rodway, who has interpreted the individuality of trees, and found them to be as sensitive as human beings and resembling them in many ways. Each tree struggles for existence among the crowd, selfishly pushing aside others in reaching upwards towards the sunlight, and crowding its roots amid myriads of tangles in search of food and water. Here in the tropics we see the survival of the fittest, the stronger trees crowding out the weaker. We have not been accustomed to look upon trees as individuals, but to the observer in the tropics the resemblance is perfect, and we can understand our Park Commissioner's affection for trees. They are to him as companions; they cannot talk, but there are human beings who are mute. The investigator can find sermons in stones. If we study them, we will find friends in trees. The South American forests contain hundreds of species, unlike our forests, which contain a small variety. The pineapple, that most refreshing of tropical fruits, grows wild in the northern parts of South America. From the fibres of the leaves cloth is manufactured. The cassava bread is extensively used in hot countries. The poisonous substance of the root is extracted by heating, and thin flat cakes are made, and are much esteemed by the natives. We purchased some of the bread and also of the root.

It is not a very delightful experience to sail through the Straits of Gibraltar in the night-time, with the wind blowing a gale and raining hard. All hands were on deck and on the alert, as we worked our way through the portals of the Mediterranean. We entered the straits at midnight. At three o'clock, the rock loomed up before us with its light on Europa Point. As day dawned we found ourselves in the blue Mediterranean, where we gazed upon the snow-covered mountains of Spain, which we were rapidly leaving behind. The next day we passed Algiers Bay and Cape de Gata, on the north coast of Africa. That night we experienced severe thunder and lightning with hail, and passed the Balearés Islands, which are five in number, Majorca being the largest. The northern part consists of lofty mountains.

We passed Sardinia, Maritimo, Sicily, and entered Malta channel, where we looked through the glass at the celebrated fortress of Malta. La Valetta, the capital, has been called the most beautiful small city in the world. When opposite Greece, our topgallant-mast was carried away, a frequent occurrence in the Mediterranean. The crew were six hours clearing away the wreckage.

Off the island of Candia, or Crete, we were driven by a gale directly towards the shore, and were powerless to change our course. Such times as these you envy those ships that are propelled by steam. I was quite seasick at the time, but dressed myself and children, and remained in the cabin awaiting our fate. Everybody on board had a serious look; and the captain was consulting the chart to find the best place to steer on shore, when the wind changed and, with deep gratitude, we bade adieu to the island of Candia. It is one of the largest islands in the Mediterranean, 140 miles long and 30 miles in its widest part. It is mostly mountainous, excepting in its eastern part. The capital is a walled city. When opposite the Nile, we saw a tree which had floated down the river.

Cyprus is a large island in the eastern part of the Mediterranean, nearly opposite Syria. It was once of great importance, but is now in a neglected condition. Leaving Cyprus behind, the next land which met our gaze was the coast of Syria, off Tyre, where we were delayed by a calm, which lasted all day.

The next morning, we came in sight of the mountains of Lebanon, and looked at the village of Sidon through the glass. In the middle of December we entered the harbor of Beirut, after a voyage of sixty-three days from New York. A pilot, dressed in Turkish costume, was taken on board. We anchored very near the town, which is the principal seaport in the Holy Land. The captain went on shore, and, when he returned, brought a basket of oranges which were grown in Syria.

My curiosity was excited by the peculiar dress of the pilot, and I asked him how the women were dressed. He replied, that all the women he saw were wrapped in white sheets. I was provoked at such an answer, but found, upon going ashore myself, that he had spoken truly. We find all the good things in Beirut,—oranges, figs, dates, almonds, English walnuts. In fact, nearly everything you can mention is to be found in the stores. Partridges and such wild game were very large and fine; mutton was also abundant.

Large quantities of Mulberry trees are seen, which proclaim that you are in a silk country. The harbors of Syria are mostly unsafe when the wind blows from certain quarters. In bad weather we are in danger of being driven on the rocks, and are obliged to weigh anchor and drop into St. George's Bay for protection. When the wind blew from the desert, my face felt burned while I remained on deck. We drove on the Damascus road to the foot of Mount Lebanon, and saw the orange trees heavily laden with green and golden

fruit. The date palms are very graceful, and the fig trees are common. It is quite an experience to eat a ripe fig taken from the tree. When they are fully ripe, they burst open, showing the seeds; they are sickish sweet, and I much prefer them when dried. The olive tree is very plentiful in all parts of Syria. The oil is used extensively in cooking and for various purposes. The color of the tree is a light green, similar to the willow. We passed camels heavily laden with stone, and a caravan of gypsy-looking carts carrying produce to Damascus.

We were invited to the home of our consignee, the wealthiest merchant in Beirut. The residence was palatial, the ceilings very high and the floors of mosaic marble.

The furniture was covered with silk from Damascus. I was admitted to the apartments of the merchant's wife. She was smoking a nargileh and ordered the servant to bring one to me. I thanked her very kindly; but there was as much tobacco in the cup when I finished smoking as there was when I began. Those who are accustomed to smoke, enjoy these water-bottles very much. We were taken to ride in the merchant's carriage, a magnificent affair from America. The houses are built of stone, with flat roofs, where the families gather in the evening, and smoke their cigarettes and nargileh, and sleep beneath the awnings. The streets are narrow, and arched in some parts of the city. The fences are of prickly pear or cactus, which bears a red fruit.

We invited the merchant's two sons on board to dine with us. When they sat up to the table I was much distressed to notice that they did not remove their hats, or fez as they call them, so I very politely invited them to do so. They informed me that a Turk never removes his hat while eating. I felt more comfortable after hearing that.

The young men were very highly educated, and were very agreeable and entertaining. They could converse in several different languages, but as Bayard Taylor remarks, in describing a Turk who fascinated him by the noble elegance of his manner, "In any country but the Orient, I should have pronounced him incapable of an unworthy thought; here he may be exactly the reverse." It is not thought necessary to educate the young ladies. When the father of a family is absent from home, he addresses his letters to his oldest son, instead of his wife.

Bidding adieu to Beirut, we sailed up the coast, where we looked upon the snow-covered mountains of Lebanon and many small

villages until we cast anchor in Tripoli. The bay is nearly seven miles long and bends in circularly. The town is situated at its southern end, at the foot of some high lands at a little distance from the sea.

Before we were allowed to land, the pilot whom we took from Beirut, held our bill of health for the health officer to read; finding it all right, he shook hands with us and welcomed us on shore. The streets were very narrow. The houses were built of stone, with flat roofs, the same as those of Beirut. We went into the merchant's office who was to furnish us with a cargo of wool. He hunted round and found one old chair, which was kept as a curiosity, and passed it to me to sit upon.

The American consul was a native of the place who had been converted to Christianity, thereby suffering much persecution from his family. We walked outside of the gates of the city, where we found donkeys and their guides waiting for customers. My husband was trying to persuade me to take a ride; but being unused to riding as the Turkish ladies do, I was rather loath to accept of his invitation. Just then a gentleman rode up to the gate and, seeing that we were foreigners, introduced himself as Mr. Lowery, an American missionary, and said he should be glad to be of any assistance to us. I dislike very much to hear our missionaries spoken slightingly of, as they sometimes are by travellers. I have very pleasant recollections of missionaries and their families whom I have met in foreign lands, and when I see a convert to Christianity like Antonio Tunis, the American Consul at Tripoli, I feel that we cannot give them too much credit for the noble work they are doing in lighting up these dark places in the remote parts of the earth. Women, in particular, should be interested in missionary work. If they could travel in these countries and see how little their sex is regarded, they would think America a paradise for women, as a celebrated traveller has called it. What makes America the paradise for women? I need not tell you that it is Christianity. Everywhere in the East we are followed by beggars. Many of them have children which they carry upon their shoulder, with the child's arm around their neck. In Beirut, while waiting at one of the stores where my husband transacted business, an old beggar woman came along soliciting alms. One of the clerks, to amuse us, knocked over the old woman and held her down by the neck, all in a playful manner; but it spoke louder than any lecturer could speak of how the Turks "reverence and respect women."

As we walked along the streets of Tripoli, every gentleman who had met my husband, would embrace him and kiss him upon each cheek. I expected my turn would come next, but I found that women were of no account whatever in this part of the world.

Here the Mohammedan religion prevails. The Koran takes the place of our Bible. Long pilgrimages are made to Mecca, the birthplace of the prophet. Many die from the fatigue which they undergo on the journey, and those who return wear a badge of distinction. Before they start on the pilgrimage, they settle up their affairs in case they do not return. We visited one of their houses of worship. The vestibule was filled with shoes; long rows of worshippers were bowing and prostrating themselves flat on the floor, all in perfect unison, while the leader repeated the prayer aloud. There are no seats of any kind. The floor is covered with mats or carpets. Some of these mosques are very beautiful, and are very numerous in all the large cities. The Orientals are devoted to their religion, and pray several times each day, with their faces always towards Mecca.

We were invited to the consul's house to dine. He asked Mr. Lowery what he could do to entertain us. He told him he thought a variety of the native dishes of the country would be a novel feature of the dinner. So we had all manner of mixtures set before us, many of which one would have to acquire a liking for. We also had an abundance of food which we could appreciate. The consul's residence was some distance from the port, so I was obliged to ride on a donkey, in the Turkish fashion; but not having on the Turkish dress, I presented a most ludicrous appearance. About half-way we met a company of boys walking towards the port. They laughed loud and long at my riding-dress. When we returned on board ship, we found that the boys had been examining our floating home; as the American flag was rarely seen in that harbor, as the anchorage is by no means safe, and the winds often tempestuous. We walked to a beach and gathered some shells, which were a foot deep for a long distance. We scooped up as many as we wished with our hands. The surf rolled on the beach several feet high on a calm day. In a gale it must have been something awful to behold. Our merchant invited me to call upon his wife. The room was furnished with mats and divans. The lady could not speak English and I was unable to speak Arabic, so we gazed at each other and smiled, sadly lamenting our inability to converse. She presented me with a sponge attached to a rock, which had been brought up from the bottom of the Mediterranean by divers.

To enjoy travelling in Syria, it is important that one should be familiar with the Bible. I know that I never before read it with such meaning as I did when my eyes beheld the places and customs of which it speaks. I saw the humble inhabitant dwelling beneath his own vine and fig tree, with his children growing like young olive plants around him.

In sailing past St. Paul's bay, where Paul's ship was wrecked and the crew were all safely landed upon the island, it was doubly interesting to have read of how Paul gathered a few sticks to put on the fire, when a viper was warmed up and fell on his hand. I could imagine that he gathered sticks; for there is no wood on the island, the fuel being brought from Sicily in ships.

Bidding adieu to the unsafe harbor of Tripoli we enjoyed sailing up the coast, and in a short time anchored in the Bay of Iskanderun or Alexandretta. This was once a place of considerable trade, being the port of Aleppo, but it is now in ruins. It has the best anchorage on the coast. The bay extends about 40 miles in a northeasterly direction and is 17 miles broad. We counted 150 camels coming in, laden with produce, from the interior. While crossing the desert the camels go without water for several days at a time, having drank enough before starting to last them. The driver carries fresh water in a skin bag taken from an animal, and when it has evaporated, as it sometimes does, he has been obliged to kill the camel in order to save his own life, by drinking the water found in the camel's stomach. Water is scented by the camel long before the driver is aware of its being near. These "ships of the desert" carry heavy burdens, weighing from 600 to 1000 pounds. They can travel 35 miles a day. There are caravansaries where man and beast can find accommodations for the night, but they must carry their own provision.

During Ramazan, the Turkish fast, which lasts about a month, the Mohammedans are not allowed to eat, drink or smoke from sunrise to sunset. It was very hard on the workmen who were putting on board cargo. But they make up during the night and endeavor to eat enough to last through the day. The rich reverse the order of things, and get around the fast by sleeping all day and feasting during the night.

We enjoyed walking on the beach at this place, gathering the beautiful, variegated stones, which we brought home and gave to our friends to use as paper-weights. The cones from the pine tree are valued for the seeds, which are highly esteemed, when sugared, as confectionery.

While lying in the Bay of Iskanderun, a Russian steamer arrived.

Henry M. Stanley and Mr. Taylor, the American Consul from Cairo, Egypt, were on board. It was so rough in the bay that the passengers could not land. Mr. Stanley and the Consul, seeing an American ship in port, ran the risk of capsizing, and made us a visit. There was an old gentleman from Baltimore, engaged in writing a book on his travels, among the passengers; but he did not dare to risk himself in a boat when the harbor was so rough. If a balloon had landed on deck I should not have been more surprised than I was to find that a boat was alongside in such a sea. Mr. Stanley had just visited the American colony, the members of which had been deluded to leave their native land and settle in Jaffa; and he entertained us with a description of the forlorn condition of the remnant of the colony which he found there. Most of them had found their way back to America, sadder but wiser people.

Mr. Stanley was on his way to the dark continent to discover Livingston. He was then a young man, full of energy and daring, quite a contrast to the prematurely old and gray-headed man whom I heard lecture in Mechanics Hall a few years ago. The African fever and explorations in an enervating, tropical climate had told upon his iron constitution.

When our distinguished visitors returned on board the steamer, the old gentleman they had told us about came on deck and cheered and waved his hat, like a schoolboy, when he saw our beautiful stars and stripes which were flung to the breeze from the mast-head to honor our countrymen on board the Russian steamer.

> "Ah! when the wanderer, lonely—friendless,
> In foreign harbors shall behold
> That flag unrolled
> 'T will be as a friendly hand
> Stretched out from his native land,
> Filling his heart with memories sweet and endless."

The longest day I ever experienced was when I was in quarantine. We came in to New York without a bill of health; and although there was no sickness on board when the Doctor examined us, or no one sick during the voyage, a law had been passed that we must show a clean bill of health. Failing to do so, we were sent to the quarantine ground for twenty-four hours, and went through all the purification process just the same as though we had yellow fever on board. After the voyage is completed, how one longs to set foot on shore, and meet familiar faces once again, only those who have been quarantined can appreciate.

7th February, A. D. 1895.

ESSAYS

BY

PRACTICAL CULTIVATORS.

Theme:—Practical Talks on Floriculture.

O. B. Hadwen. The hour for which this meeting is called having arrived, I will ask you to come to order. The subject this afternoon is, Practical Talks on Floriculture: a subject which interests most everyone.

There is nothing more beautiful, nothing that can embellish our homes, and our gardens, and our farms, so well as the display of flowers. The interest has grown in late years far beyond what we originally expected, so that now you can scarcely pass a single house in the town or country, without seeing a display of flowers in the windows, in the woods, or in the fields. Perhaps there is nothing that gives more pleasure to all, than a good display.

I am one who believes that the people who get the most out of life have a fondness for flowers. Farmers can grow them. Everyone can grow them, especially ladies; they know more about flowers than men.

I know that sometimes when I go down to Boston and get something entirely new, and bring it home and plant it out, and then when I get it nicely to going, I will ask my wife to come to look at it, and she will say, "O yes, my mother had that more than fifty years ago;" so old things become new.

But the chair don't propose to take up the time of the audience, so I will call upon Mr. Blake of Rochdale.

WINDOW PLANTS.

Fred. A. Blake. A few words to beginners on the culture of window plants. Two of the principal reasons of failure suggest their own remedy, viz.: Dry atmosphere of rooms, over- and under-water-

ing. Other causes of failure are: Watering with very cold water in the hottest part of the day, instead of at night or early morning when the roots are nearer the temperature of the water.

Miscellaneous collection of plants, natives of torrid and frigid zones, in same window, under same conditions, which reminds one of the Irish woman who complained to her landlord that the water had risen so high in her cellar that it had drowned her hens. He replied, "An' why didn't yer kape ducks." The moral of this is: Select plants suitable for the position in which you are obliged to grow them. Both pond lilies and portulaccas will not flourish in the same tub.

It is natural for the flower lover to covet every variety of plant he sees; but if he wishes for success, he will consult some competent florist, explaining to him the conditions under which the plants will have to be grown, and let him select such varieties as are best suited to those conditions. Thereby he will save time, money and serious disappointment.

Among the best plants that may be selected for the average window, I would prefer some of the varieties of fibrous and tuberous begonias, for winter and summer respectively. By their proper use, we may keep our windows beautiful the year round; and they have one great advantage,—so far as I am aware, there is no insect foe yet discovered that troubles them.

With the pots about one-third full of suitable drainage material there will be no danger of over-watering, unless it may be from leaving water standing on the crowns of the tubers in the tuberous section, which would cause the shoots to rot off.

Of the fibrous section, I will mention as a few desirable varieties:

Thurstonii, one of the best for beauty, both of foliage and of flower.

Semperflorens Gigantea Rosea, a continuous bloomer and most beautiful. Then

Rubra and Metallica.

Vernon, which anyone can easily raise from seed, is always covered with bloom, even when only an inch or two high, and is a very desirable plant indoors or out.

Alba Picta, pretty, ornamental foliage and good flowers.

Argentea Guttata, beautiful foliage.

Manicata, Aurea, large glossy leaves blotched with creamy white. Delicate blush-white flowers on long stems.

Pictaviensis, leaves bronzy green on face, underside rich purplish red, large clusters of rosy-white flowers.

Diadema Robusta, grand variegated foliage.

Otto Hacker (new), fine foliage and bloom.

Wettsteinii (also new), fine ornamental foliage, flowers similar to Rubra, but lighter color.

With these, a few of the Rex varieties might be desirable, though the air in most living-rooms is unsuitable for them on account of its extreme dryness, which for human as well as plant life should be obviated.

Of the Tuberous section, unless one has a large amount of money to spare, one will find the mixed Tubers about as good as the named varieties, and they cost much less. The best way of all, however, is to grow them from seed, starting in January, or even in December, so as to have plants in bloom from early summer till fall.

For one who has never tried it before, it is quite difficult to start the seed; but it is really very easy after you know how. I will not take your time to explain, but can tell you all I know about it in a very few minutes in reply to any personal requests.

I have named only a few of the many beautiful and desirable varieties of Begonias; but with these, and one or two suitable Palms and perhaps an Azalea, say the beautiful Veitchii Grandiflora, one may have a window that will be a joy the year round.

Mr. Watts, as requested, will give us something in relation to flowers.

They asked me to give you, this afternoon, my experience in growing Gladiolus. They think we understand it as well as anything else. You are well aware that the Gladiolus makes as fine a show in our gardens as any flower. Then it is a very showy flower, and is a lasting and useful flower; for when it is necessary that we should use any for making decorations there is not a flower that is its peer. In the little talk, which I am to give you, I will show the way we propagate the Gladiolus. (Here he cut the bulbs into eyes). Now, they take that eye and cut it out; but when you cut it, it is not exactly as the potato. You have to be very careful to cut off a portion of the rim that is close to that eye; for the simple reason that all the roots which form are around there, and that starts the new bulbs to grow. The bulbs that have flowered will never flower any more. The bulb that you plant does not flower, because it flowered last year; but by cutting the eyes out like that, these little bits will grow, but they will not make flowering bulbs this year. But next year will. In starting with the seed, of course they grow little bulbs. Late in the second year, after the sowing of the seed, if you have good success, they will come into flower. There is only one bulb the second year, like this one in my

hand. The choicer kinds will have a tendency to grow like that. They don't increase rapidly like the poor ones. One bulb so planted will produce three. Now at the foot of these little bulbs, there are a lot of little ones like them; they are what we call bulblets, and will produce other bulbs true to its variety every time. I am asked a great many times doesn't the Gladiolus run back? I will say right here, they don't run back? They come true to the variety of those planted every time, and the reason that people suppose they run back, is because the good one only produces one and the poor ones produce five or six. The good one is liable to die. I never knew any poor ones to die, if we are anxious to propagate a variety. These little bulblets are covered with a very hard shell. You take it and split it with a knife, and peel it off. That makes it grow twice the size that it would if you had planted it as it naturally grew on the side of the bulb. Some bulbs when planted only produce one bulb, but they are liable to have three or four and sometimes a whole handful. A poor one will increase a great deal more rapidly than the good one.

I have jotted down here a few names of varieties that I know are desirable. I will say right here that anyone wishing to grow Gladiolus will do well to take some of the named kinds; for you know what you are growing and can reasonably expect to receive good results. When you grow mixed varieties, of course they make a fine show; but if you ever want to gain any desired point, you are not capable of doing it. Now I will start and run through a few of the best varieties.

Addison's, it is a very dark one and always comes good.

Aurora, this is another fine one that always comes good. It is a bright salmon.

Baroness Burdette Coutts, this is one of the finest. It is a choice shade of lilac. Anyone wishing to grow a good flower, there is no Gladiolus that takes its place.

Camelian, this is another very attractive flower; it comes very close on the spike.

Conqurant, this is an immense spike; it is very large and is a dark crimson with a white centre. It is a very fine thing.

Crupsele, is a light one, and has a very small bulb; the flower that it bears is equal to the one that the *Baroness Burdette Coutts* bears.

Flamingo, is a very large, striking, magnificent flower, and is a bright scarlet.

La Candeur, is a white one with a stripe through the centre of the lower petal.

Drap D'Or, is a dark lemon; but when I say lemon, there is a

great variation in the light and dark ones; but it is the only color that we could actually call them.

Meyerbeer, is a scarlet one, and is one of the oldest ones we have. It has a fine spike, and is one of the most attractive ones that we have.

Norma, is another good one.

Pacto, is an early one; it is a light lemon and is a very fine flower, and one that always comes good. I never saw a poor one.

Brennus, is another very fine flower which always comes good; it is very showy and is a very dark slate with a white throat.

Shakespeare, is a light one, and one of the best of the light varieties. Anyone wishing to grow light, that is the one to grow.

Snow-white, is as white as anything we have. With me it is not a good grower; I have seen some pretty fair stalks of it, but I have never succeeded in growing any myself.

Those I have named are of the Hybrids of Gandavensis. Now comes the Hybrids of Lemoines. They are advertised as being a hardy kind. They are perhaps hardy, but they have got to be under such favorable circumstances that the ground won't freeze down to the bulb. I have left them out-doors on purpose to test this thing. I know they have been planted in places where they stayed for years, but the frost never went over three or four inches into the ground, never far enough to reach the bulbs.

Lafayette is a very desirable one.

Rochambeau and *Gumbleton* are both good ones.

All these flowers you must remember come in the shades of purple and yellow. It is one of the distinguishing features of them.

Within the last few years they have introduced a new hybrid. It is called the Hybrid of Nancianum. I have not grown those. I have seen them grown considerable. They are very large flowers; the color is very striking, but there are very few flowers open at the same time on the spike. If you wish to buy a spike of Gladiolus, you want one that has five, or six, or a dozen flowers in bloom at a time.

Question. I would like to ask if Gladiolus don't go back, why it is we don't see some of the kinds we used to see as distinct now as they were in former years.

Answer. You do. The African, at my house, is just as distinct as I ever saw. It is a very hard bulb to propagate. When I say that they don't degenerate, I have never yet seen any bulb that I planted degenerate. They do die out; for often I see lots that I grew years ago, and which I know I have never done anything to, to dis-

place, that I have not got now. And, then, there are lots of kinds that I used to have that I don't possess now. It is an indisputable fact, that the class that is now being grown is a great deal superior to the class grown ten years ago.

Question. Have we any better than the *Eugene Scribe?*

Answer. *Eugene Scribe* is one that I intended to mention; it is one of the finest; it is just as good to-day as it ever was.

We must all remember and not feel disappointed, that when you come to an exhibition of Gladiolus, and see so many fine flowers there, and you say that you can't grow them like that, that the one that grows hundreds and thousands has a large crop to pick them from. Those that grow but one or two dozen have only a few to choose from.

Question. Will you tell us how to grow Gladiolus?

Answer. I have already run over my time.

Question. Well, I think the members will allow you a little more. I think they would like to know about the soil; as to what soil is best adapted to it; how deep to plant; the time of the season for them to blossom; what time to take the bulbs up; and how they are kept through the winter. Now, there are some questions to answer.

Answer. Now, to start with the cultivation. The best land that we have ever found to grow them on, is partially moist, sandy loam; it doesn't want to be wet, but it wants to be moist, and it wants to be land that has been worked one or two years. I would use as a fertilizer either stable manure, or bone-dust, or one of the fertilizers that is on the market. Either is good, of course the bone-dust or fertilizer is better for anyone that is only growing a small quantity. To plant the bulbs we run a horse-hoe through the soil, digging a furrow four to five inches deep. Then, if we use commercial fertilizers, we strew them along into that trench and then scratch a little dirt over it, and then one fellow takes a brush and stirs it up and that mixes the manure through the soil. We don't use any stakes; the Gladiolus grow up and they have to stand on their own bottoms, and if they don't do that they get pulled up.

We dig the bulbs in the fall, as soon as the leaves commence to turn yellow, along the last of October to the first of November; but I think we shall begin to dig about the first of October after this. This year we had a snow-storm come on the last of October and that very much discommoded us, yet it didn't discourage me. I thought that would all go away in a day or two, but we were very sorry to see that it came and stayed; thus my advice will be to begin to dig the Gladiolus pretty

early, soon after the first of October. There is one thing, if the Gladiolus is planted correctly, it will take a great deal of freezing before the bulbs are damaged, because they are four inches under the soil; and in the early fall it has got to be very hard freezing that will freeze down four inches in depth. But I will say that though we dug as rapidly as we could, before we could get them all dug, that cold freezing weather went so deep into the ground that the bulbs were perfectly encased in the soil. Part of them were hurt and part of them were not. First, we dig them all up and lay them on the ground, then with a knife cut off the tops about an inch from the bulbs; then put them into the boxes. If we have more than we have room for, we put them into barrels, and put them into the cellar. We have at the present time some barrels in the cellar that have not been handled. Now, anyone who has only a few to handle, the best way is to dig them up and keep the tops on. They will dry perfectly. After they get thoroughly dry, we take them and take the old bulb off from the new ones, and then they are clean, and ready for sale or to be planted next spring.

Question. Well, you have described how to get the soil ready, and how to spread the fertilizers through it, but I don't think you told us how deep to plant them?

Answer. Four inches.

Question. I don't get the idea?

Answer. We get a trench four inches in depth, and plant them there.

Question. How close in the row?

Answer. Well, at our house the boy takes a pail and he goes along and strews them in the trench so that they will be anywhere from one on top of another to a few inches apart; but if anyone wishes to do this scientifically, I suppose the prescribed rule would be to plant them about six inches apart. But we get just exactly as good flowers when they are put in some on top of the others and some two or three inches apart. We plant them very thick, for if you plant them too far apart they take up too much room. I will say one thing: we make our furrows about thirty inches apart, so that there is thirty inches between the rows. We do it all by horse power, only just the weeding in the rows; that is done by hand, so as not to injure the plants. Does that cover the questions?

Answer. It covers all mine.

Now are there any other questions any one would like to ask? I will say one thing; along the last few years the display of Gladiolus

at our Hall has not been so liberal as it used to be. I don't know why it is. I don't see why any lover of flowers should forego the pleasure of having a few Gladiolus.

Question. How long does it take those little bulblets to flower?

Answer. It will take three years. The first year of their growth, you get a little bulb as large as a pea; but the bulb, as that is now, will grow right on the top of that little one that is inside, and it will be just about as large as what that is. Next year that will make a good reasonable growth. My seeds will make bulbs from the size of a good Marrow pea up to the size of a walnut. I don't know but what they would keep on growing all the time. I have never tried it; but I think I will go home and sow some seeds to see if they will grow continually and keep growing and come into flower.

Mr. Draper. By planting them as thick as he suggests, so many stalks together will be self-supporting. I have very clear recollections of the way J. M. Earle used to plant Gladiolus. I happened to be at his place one time when he was laying out a bed. He was a very methodical man. He had laid out his bed the length of his garden and four to five feet wide, made it very rich and raked it over; and then he had that marked out as regular as the squares on a checker-board, so that every bulb would be planted six or eight inches apart. Then he would place his Gladiolus where those cross squares would intersect each other, and six inches in depth. Thus they were planted so many inches apart each way and just so many inches deep. They were very symmetrical.

One thing about Gladiolus; there is no flower that will keep so long in the house as that will. There is no flower that will produce a better effect.

Mr. Watts. I would like to say I have tried this thing and proved that so much labor is perfectly useless. You had better put them in as I have put them in, and take a chair and sit down and watch them grow.

I will show you that all the labor of our friend Earle and the way he put them in is perfectly useless and amounts to nothing.

There, now, he has taken a good deal of pains to put them in perfectly upright, and put them down just six inches. Now this eye on top dies, this one here below is going to grow; but it is not going to come up straight, it is going to start right up here. Now he has lost his line of symmetry. If he is going to put a stake there, he can do it easily enough. I used to do as everybody else did. I used the stakes to keep the Gladiolus straight, but now I have abandoned that and put down strong stakes, about three in the length of this room,

and run a wire from stake to stake, through the centre of the rows; and then as they came up,—the wire was eighteen inches or two feet from the ground,—we would tie the Gladiolus to that.

Mr. Pond. I have grown Cannas a great deal, and I think I always have good luck with them. This winter I asked Mr. Hixon if he wouldn't take my bulbs, and he took them and kept them, and this spring he informed me that he had lost them. I think I have discovered a way to keep my bulbs: I put them into my boiler-room and there I got them thoroughly dry. I examine them occasionally and they look as if they would come through nicely.

In preparing the ground, I take a piece about twelve feet across, in a circle, and put in about four barrels of night soil; then in about three weeks I set out my Cannas and water them every night, and keep the water on them about as freely as Mr. Hixon does on his Sweet Peas. I don't know but what I grow them about as large as anyone. I think I showed Mr. Hixon my Cannas, and he can judge if he ever saw any much larger. My Sweet Peas, I just dig a trench and dig it down about six inches deep, and then take a spade and go down about six inches more and loosen it up, and then I fill it up most full of either some night soil or what comes out of a cesspool, and then I work it together. I intend to do that in the fall. As to picking, I am very particular; one portion I pick one day and another the next; if I see a bud I pick it off. Keep them picked as close as possible if you want a good many flowers.

And my roses; I have a large variety of very fine ones. I have one bed twenty feet square. I make it as rich as possible, and last spring I put on some of that which came out of the cesspool; I think I put eight barrels into that bed, and then I put on some manure. In the spring, at the proper time, I cut them down to about a foot from the ground, perhaps a little lower, and I have roses from June to November.

Mr. Draper. Our friend Pond must have a monopoly of Pond's extract.

There is a great deal of complaint from those that grow house plants in the winter season. Some ladies make their plants look well all through the winter, and others have their plants look tired and discouraged. I wish friend Blake would tell us how to get rid of the insects.

Mr. Blake. *Mr. Chairman*,—I don't know what the best way is to grow plants. For the best plant on all occasions I recommend the Begonia. These are only a few varieties that I happened to have in bloom, but they are always in bloom. The best way to have a window

full of flowers is to have some Begonias. There is such a variety of foliage. I can't imagine a better window than one full of Begonias. If you get Geraniums and Petunias, most of them being summer bloomers, you don't have good success. Now with the Begonia you don't have any trouble with insects. As to getting rid of insects, it is utterly impossible.

Question. Is the Begonia sensitive to gas?

Answer. I don't think it is. It is the only plant that is satisfactory for the house grower. They won't stand a great many degrees below freezing.

Mr. Hadwen. I want to speak for the Helianthus, which is the sunflower. I have taken quite a little pains the last few years to get a collection. It has quite a large flower, and is very effective outdoors. I believe I have some sixteen varieties, some of which will grow as tall as this room. Some of them have perhaps a thousand blossoms, and as they are so tall they make a beautiful ornament for the garden. I have been very much pleased with my experiment.

Then there are the peonies in various varieties. There is none that surpasses the old-fashioned red one. I have a little plot at my home which I have set out solid with one kind (that is the old-fashioned red kind), and there is nothing in my grounds that equals it. The foliage lasts all summer after the bloom is gone, and is really an ornament in itself. They are growing in favor. They need rich land, as all flowers do.

One of the most exquisite flowers that we have is the Anemone Japonica from Japan. It is very handsome, with white petals and a yellow centre. It is not liable to be injured by insects, gives a fine autumn bloom, and seems to flourish in all soils.

Then there are the Rhododendrons, which are growing in favor. We used to think they were not hardy, but now we have a great many kinds that will stand the most severe climate.

Then there is our common Mountain Laurel; it looks beautiful in the fields, and until lately we have let it stay there. Still, when it is cultivated, it seems to be a favorite. I think that they don't want too much shade. They don't want to be planted under trees that sap up all the moisture. They will repay a little care in their cultivation. Anyone can take them up and plant them, and they will feel that their care and time are amply repaid.

14th February, A. D. 1895.

ESSAY

BY

Miss ARABELLA H. TUCKER,

State Normal School, Worcester, Mass.

Theme :—Trees of Worcester and Vicinity.

In these modern days of amplification and extension in every department of learning, and especially in that of science, when the good old fences that used to define so exactly the fields of knowledge, that in a fourteen weeks' course we could learn all there was to know on any subject, have all been thrown down, the possibilities of human attainment have come to seem almost boundless. Stimulating as this is to the imagination, it is a little discouraging to the average individual, who finds it impossible to keep up with the results even, that are being attained by those who are working in special lines. Only the teacher of a country high school in some very remote district pretends to an acquaintance with astronomy, botany, chemistry, geology, zoölogy and the various other "ologies" that his course of study requires him to teach; and even he would not claim to have a very comprehensive or exhaustive knowledge of any one of these great subjects. The genuine scientific man in these days is a specialist; he gives his days and nights to investigation and study, not only of a single subject, but often of a small subdivision only of that subject; witness the case of the enthusiast who devoted his whole lifetime to a study of the crayfishes of South America. This tendency to specialization, or rather this necessity for specialization, is well shown in the modern scientific literature. The titles of the books show their limited range. The latest book on Ornithology, for example, "The Bird's Calendar," by H. E. Parkhurst, treats of the birds actually seen month by month in Central Park, New York. Another recent one is called, "The Hawks and Owls of the United

States in Their Relation to Agriculture." There is a kind of fashion just now of taking some restricted locality and making a study of its plant life or its animal life, its rocks or its soils.

It looks then as if we must all be either specialists or smatterers: you may contend that a specialist is necessarily narrow, but I know it is one of your horticultural axioms that a small field well cultivated will yield a better harvest than a large area which one has neither the time nor strength to attend to in any proper manner. Since we are forced to decide between these two alternatives, it seems to me the part of wisdom, out of the great number of possible interests, to "choose the one that we love best"; and having chosen, to give to that what small portion of our time and strength remains, after the "getting and spending" in which we "lay waste our powers."

If I were asked what subject of out-door study a dweller in a city could most profitably and easily pursue, I should answer unhesitatingly The Trees! We Americans are reproached with not knowing the names even of the trees that grow in the streets through which we walk every day, and I think you will agree with me that the reproach is not unjust. Curiously enough, these splendid representatives of the plant world are not so generally known as the smaller and less striking forms. Persons of considerable botanical knowledge, who may be said to be on terms of intimacy with the common wild flowers and somewhat familiar with even the rarer species, have hardly a speaking acquaintance with the trees. That is, while they may know a maple from an oak, and an elm from a horse-chestnut, they do not distinguish the different species of maples and of oaks, nor know that the horse-chestnut is not as native to our soil as the elm. This ignorance is partly due to the fact that in the ordinary text-books of descriptive botany, the parts of the trees described are mainly the flowers and their organs, which are difficult to get at, generally inconspicuous and always short-lived. In later Manuals, such as Apgar's "Trees of the Northern United States," and Newhall's "Trees of North-eastern America," attention is directed to some of the more permanent characteristics, such as leaves, bark, wood, fruit, &c.; and the species are identified by means of these. With the help of the very ingenious key which accompanies each of these books, there is no reason why a person with no previous training, should not be able to identify all the trees to be found in our locality. But there is some time and labor involved in getting specimens and comparing them with printed descriptions, and some exercise of discrimination and judgment in deciding whether the two

correspond so closely as to make identification absolutely certain; and there are many of us who would like to know something of the trees about us, who have neither the time nor the inclination for the kind of work this involves. For the benefit mainly of such persons, a kind of tree directory has been invented, and the evolution of such a book is an interesting example of the specializing tendency I have just mentioned. The French botanist Michaux, who did so much work on our Flora, first published his North American Silva, which he called "A Description of the Forest Trees of the United States, Canada and Nova Scotia," in the year 1819. A good deal of ground he had to cover. In 1846, agreeably to an order of the legislature, George B. Emerson wrote his Report on the Trees and Shrubs growing naturally in the Forests of Massachusetts, a less ambitious work in its scope, but more thoroughly done. In 1891, John Robinson, of Salem, wrote a detailed account of the trees growing in the streets and gardens of his own city, accompanying his descriptions with exact locations. If he had wanted any exclusive right in this invention of his, Mr. Robinson should have had it patented; for it was followed in 1892, by Prof. Humphrey's "Amherst Trees," in which the author claims to describe and locate all the trees growing within a radius of a mile of the post-office in Amherst. Last year a similar account of the trees of Worcester appeared, and I know of at least one other New England city, Augusta, Maine, whose trees are being inventoried in a like manner. Let us consider for a minute the convenience of such a guide to those interested in studying the trees. You all appreciate the ease with which you are able to find anybody by means of your city directory. If you want Thomas Smith, and don't know where he lives, you consult the bulky volume of Messrs. Drew and Allis, and find immediately his street and number. Suppose it is the Norway maple you want to make the acquaintance of and you don't know where it is to be found. If your tree directory is at hand you can find with equal readiness where it is at home. If this isn't levelling this particular hill of knowledge, it is at least putting an electric railway to the top and making the ascent possible without effort. Perhaps you read that, at 772 Main Street, there is a well-grown specimen of your maple; the next time your business or your pleasure takes you in that direction, your acquaintance with it will at least be inaugurated, to be continued in future meetings; and in the case of many trees, if you are found worthy, to ripen into friendship and even intimacy. And how much pleasure is added to our restricted city lives by these friendships! A walk over brick

pavements has little that is ideal about it; most of us would choose a country road instead. But if we have eyes to see, there is beauty and ever-varying interest over our heads; for few of our thoroughfares are destitute of trees. Pleasant Street, for example, has little to recommend it but its trees. I don't believe a stranger would be greatly impressed by its width or its architectural beauty; but looking up the street toward the west, its vista of arching elms, especially if there is a background of sunset sky, is one of the loveliest sights our city can show. What a barren waste Front Street would be if it were not for the fine trees that have been preserved on the Common; and what an irreparable loss Main Street suffered when its splendid old elms had to go! To a real lover of trees they are equally beautiful and interesting at all seasons of the year, and we do not properly know them unless we can recognize them as quickly and as easily in winter as in spring or summer. On some accounts winter is the most favorable time to observe them, for then the distinctive habit of each, which is disguised by the foliage in summer, may be seen at a glance; the bark is more beautiful and more clearly shown, the character of the spray, the markings on the twigs, the size and position of the buds, are all features by which we are enabled to distinguish the different species as readily as we do when they are clothed in their summer attire. Spring, the season of unfolding buds, is a very busy time for the tree-lover; from the blossoming of the white maple, the last of March, to the flowering of the chestnut, the last of June, he must be on the alert, or some beautiful but transitory stage in the development of leaf or flower in some one of his favorites will have escaped him. What has been called the "misty season" of the trees, when the unfolding leaves gives them the appearance at a little distance of being enveloped in a soft haze, is a very short but very precious time. We appreciate, in some measure, the gorgeous spectacle presented by our trees in the fall; but how many of us know that the new leaves of spring are colored as beautifully, and in many cases as brilliantly, as those of autumn? Most of us have eyes for the blossoms of the red maple covering the bare twigs like coral; but we are blind to that infinitely prettier sight, a rock maple in full bloom. We look with approval on a horse-chestnut tree decked out with its showy flowers, but the blossoms of the oak are entirely unnoticed by us. The opening leaf-buds of the hickory, the half-grown leaves of the oak, the flowers of the birch,—all these and many other beauties are displayed for the most part before unseeing eyes. Anything that succeeds in awakening an interest in the trees is

a boon, whether it be from a scientific standpoint or from a practical, whether it go no deeper than a desire to know the name of each merely or to collect a leaf from each; for it makes us look at them, which cannot fail to result in greatly increased enjoyment of them—and enjoyment, it seems to me, is the highest end of all instruction and all training.

With all the trees in our public parks and private collections this city furnishes an excellent arboretum for the student. Compare our opportunities in this respect with those in Salem. John Robinson, in commenting upon the "Trees of Worcester" in a letter to the author, says, "We have in Salem no public parks where trees may be seen and studied." But with all our riches in this regard, one assistance that might well be furnished the student is lacking,—our trees have no labels. To anyone interested in learning them what a help it would be if there were any place where named specimens could be seen! If, in Elm Park for instance, where may be found an example of nearly every one of our trees, there were a generous supply of labels, such as may be seen on the trees in the Boston Public Gardens, the collection would be not only much more interesting, but much more valuable. I wish "the divinity that shapes our ends" in this matter—the Parks-Commission—might be brought to realize the importance of doing for the public what one member of the Commission has done for his private grounds, and devote some small part of the annual appropriation made by the city to letting its citizens know what kind of trees they have.

A somewhat careful enumeration of the trees growing here gives us a total of one hundred and sixty-one distinct species, and it is quite possible that some have been omitted from this list. Of these one hundred and sixty-one species, fifty-six are strictly indigenous to our soil, and consequently have the strongest claim on our attention and regard. Of the remainder, thirty-five have been brought from other parts of the United States, and we have seventy foreigners. With so large a list as we have to choose from of trees that have proven their adaptability to our soil and climate, it is a pity that the planters of trees, here and elsewhere, during the last generation, have experimented so largely with foreign species. Our own maples and spruces, our beech and our pines, have been passed by and the corresponding European species planted; in many cases an inferior tree to our own and always at a disadvantage here because of new and trying conditions. The very general planting of the Lombardy poplar during the early part of the present century was the most colossal mistake of this kind that we have made; but those wisest in the matter consider our

present wholesale adoption of the Norway spruce,—not only more planted here than any other evergreen, but more than all others put together,—a mistake similar in kind and hardly less in degree. Not only does the fact that a tree is an exotic give it great value in the eyes of many, but if in addition to that it shows some abnormal characteristics in foliage, or habit of growth, it becomes almost irresistible. For example: it being natural for leaves to be green, we seem to prefer almost any other color; and trees that show purple or bronze, variegated or spotted foliage, fill up much of the space in the dealers' catalogues. Nature gives us some leaves that are handsome because of the way they are cut or lobed, as the maple and the oak, but it is art that produces leaves that look as if they had been snipped out regularly with a pair of scissors till hardly any leaf substance remains; then if these little segments are curved in such a way as to suggest an eagle's claw, we get a very popular tree. A tree whose habit of growth is erect is greatly in favor if it can be made to weep or send its branches downward, and weeping ashes and birches find ready sale; while if the tree grows naturally in a somewhat drooping manner, like the elm, we are not satisfied till we have produced a pyramidal variety that sends its branches straight up like a Lombardy poplar. After scouring the whole continent of Europe for new species of trees, adventurous arboriculturists, sighing for new worlds to conquer, have turned their eyes toward Asia, and the latest fashions are all from the East. It looks as if there would be no halt till we have tried every tree that China and Japan can furnish. The similarity between the flora of these countries and our own renders it likely that such introductions will adapt themselves more readily to their new environment than have many of the Europeans; the ailanthus, the gingko, the mulberry and some of the magnolias have so far seemed to encourage this view, but the question is not one that can be settled in short periods of time. Since we must wait almost a lifetime before a final verdict can be pronounced in experiments of this kind, and as we are all a good deal restricted in the matter of lifetimes, our mistakes become practically irremediable. It is the province of the arboretums and other public experiment stations to pass upon all doubtful cases. With unlimited time and the power to command a great variety of conditions, they can give the foreign immigrant the most thorough trial, and decide whether it is capable of naturalization and what sort of a citizen it would make in our republic of trees. Failures here would not be so costly nor so depressing. Pending the decision of such a tribunal, let us restrict our individual planting to those trees

that we know will be a delight and a solace, not only to ourselves, but to succeeding generations—the trees that have sheltered our forefathers and inspired our poets. Lowell was too genuine an American to have had any exotic tree in his mind when he wrote,

> "Who does his duty is a question
> Too complex to be solved by me,
> But he, I venture the suggestion,
> Does part of his who plants a tree."

Perhaps a little account of the classification and relationships of our trees will not be out of place. Instead of belonging to a single order or family of plants, as is sometimes supposed, they are distributed among no less than sixteen different families; and if we include the introduced species, we find we have representatives of nine families more. The largest order, by far, is the *Cupuliferæ*, the great oak family, which is now made to include besides the oaks, the birches, the alders, the hornbeams, the chestnut and the beech, seventeen species in all, or nearly one-third of the whole number of our native trees. We are very rich in oaks. We have white oaks and black oaks, red oaks and scarlet oaks, chestnut oaks, and swamp oaks, all to be found easily in and about our city. They grow slowly and reach the greatest age of any of our trees. We are too new a country, and our efforts have been too long directed toward cutting down trees instead of preserving them, for us to have any reliable data as to their age; but in England there are oaks known to be a thousand years old. There is little doubt that the white oak standing in the fence at the east of the Thomas Street School is a genuine aborigine. Here was the first burial-place of the early settlers, and it is on record that the spot was shaded by a beautiful grove of oaks, of which this is probably the sole survivor. We are also rich in birches, having five native and three foreign species. The commonest of all, the little white or gray birch, is very generally known, but not half enough admired, I am convinced. There is no season in which it is not an important factor in the beauty of our New England landscape. The true white birch is the paper or canoe birch, often supposed to be confined to higher latitudes than ours; but as a matter of fact found all through this State and sparingly as far south as Long Island. Of course it does not attain the size here that it does farther north, but we have one specimen, that on the farm of Mr. F. J. Kinney at Tatnuck, which would compare favorably with the best of the great birches of the New Hampshire forests. Looking at this splendid tree, with its gleaming white trunk and branches, a birch-bark canoe

or tent seems a possibility. A large specimen of the black birch growing on the hillside west of Coes Pond has attracted a good deal of attention because of its peculiar appearance. The tree apparently started as a seedling from under the side of a large bowlder, and in growing its roots have penetrated a crack in the rock. As they have increased in size and strength, they have lifted a mass of this rock, estimated to weigh not less than fifteen tons, some distance into the air. The yellow birch was one of the vegetable loves of Thoreau, who considered the meeting it of sufficient importance to record in his journal. In one place he says of it, "The sight of these trees affects me more than California gold. In the twilight I went through the swamp, and the yellow birches sent forth a yellow gleam that each time made my heart beat faster." The commonest birch to be seen in our city is a variety of that English birch that the poets have called the "lady of the woods." I mean the cut-leaf weeping birch.

If we proceed on a numerical basis, the family to rank next in importance to the oak is the *Coniferæ*, or pine family, for it contains nine of our native trees, and a family that gives us the pines, spruces, hemlock, fir, larch, white and red cedar, and arbor vitæ will be generally allowed to have other importance than that of mere numbers. To have produced the white pine alone, would be enough to distinguish it. A tree of which Professor Sargent says, "It is the most valuable timber tree of the region it inhabits and no other tree, perhaps, has ever played such an important part in the material development of a country. It has brought cities and railroads and great fleets into existence, and furnished employment to tens of thousands of laborers." We no longer allow these trees to grow to the height of those we read of in the old forest, where they towered two hundred and fifty feet and more toward the sky, and we have little to help us in determining their age; but the two old pines bordering Institute Park, on Salisbury Street, and that in front of the Wetherell farmhouse, at Newton Square, must have been standing there before Columbus found his way across the trackless Atlantic. Instead of planting such a tree as this, or our beautiful hemlock, the Scotch and Austrian pines, the Norway spruce, and the gingko are too often chosen.

The family that gives us the walnuts and hickories, the *Juglandaceæ*, ought surely to be named next. The true walnuts are the black walnut and the butternut, but in New England we apply the term wrongly to the hickories. Though the black walnut is not indigenous to this part of the State, it is admirably adapted to our soil, and

makes a handsome as well as a very valuable tree. Opposite No. 38 Hanover Street is growing a real English walnut, a tree that is supposed to require a warmer climate than this. I have been unable to find out anything of its origin or history, but it produces an annual crop of nuts in no way inferior to those of the markets.

The *Sapindaceæ* includes the horse-chestnuts and the maples, each genus having a good many valuable species. To the Rose family belong, as all know, our best fruit trees, and in addition to the apples, pears, and cherries, it gives us the mountain-ash, the wild thorn, and the shad-bush. The *Salicaceæ* is the family that gives us the poplars and willows, quick-growing trees, whose wood is of slight value. Our native willows are mostly shrubs, but two of the European species, which make good-sized trees, were introduced here so long ago that they have become thoroughly naturalized in the older parts of our country. The locusts, the virgilia, and the red-bud are found in the bean family, the *Leguminosæ;* the tulip tree and the magnolias make up the family *Magnoliaceæ;* the nettle tree and the mulberries belong with the elm to the order *Urticaceæ;* while of the remaining species, the linden, the sumach, the tupelo, the ash, the catalpa, the sassafras, and the buttonwood, each is the sole representative of its family. Of all these trees, some are suited to one sort of planting and some to another, not all are adapted to being set out in our streets; but I wonder if a much larger number might not be profitably used for this purpose than is used here at present. One hesitates before making a suggestion to such a body of men as the Parks-Commission, who have done so much and such judicious work for the future in providing our new streets with trees; but I sometimes think the future citizen may weary of his miles of Norway maples, his leagues of rock maples, and his avenues of white ash. Perhaps these three species have proved themselves the best all-round trees for the purpose under the conditions that prevail here, where the two most necessary qualifications for a good street tree are said to be the ability to pick up a living on a scanty diet, and patience under abuse of every sort. But the best, if used exclusively, may become monotonous. Has the elm fallen into disfavor as a street tree? It would be hard to understand why, with such examples of its possibilities as Lincoln Street shows. The silver maple is seldom planted, and I know the objection is made that it is fragile and easily damaged in storms; but such trees as that at the Washburn place on Summer Street, and the one at the corner of Harrington Avenue, go far to restore our confidence in its hardiness. The linden and the

tulip, the tree of heaven and the poplar, are generally considered well adapted to the street, and I wish we might have avenues of oaks and beeches.

My only argument for the study of trees is the pleasure to be had from it. Of the educational value of such study I have said nothing. I believe I cannot do better, however, in closing, than to quote what Professor Sargent says of this aspect of the subject, in an editorial article in "Garden and Forest," entitled "The Tree as a Schoolmaster." "When its economic uses are to be considered a wide field opens to the tree-student as he learns how great a part it plays in every enterprise of man. To it he owes his dwelling and his boat, his oar and his weapon, often his clothing and his meat and drink; it has modified his character, determined his history, and been a staple of his commerce with other lands. Far-reaching has been its influence upon the race from prehistoric days until the time when the wooden walls of England became the bulwark of that liberty of which our independence is the outcome. Thus the story of the tree leads to the history of the race which it has so strongly influenced, and opens out the whole human horizon to its pupil. Hence he who makes a companion of trees, and seriously seeks to learn the secret of their importance, finds his own mind and knowledge constantly expanding with the effort to master this ever-widening topic. As the subject grows, he himself grows; his silent but wise instructor conducting him step by step to higher and wider outlooks; to a more comprehensive grasp of information; to a keener understanding of humanity; to a deeper reverence for nature; while filling him with unending surprise at the educational resources of that schoolmaster which has opened to him the door to the whole world of knowledge."

21st February, A. D. 1895.

ESSAY

BY

JOSEPH JACKSON.

Theme:—Our Native Plants and Flowers.

If the constantly increasing number of books, both technical and popular, which deal with plants and plant-life, is any sign of the interest in native floras, then there never was a time in the world's history when this interest was so widely spread or was more intelligent.

The great number of journals devoted to botanical and kindred investigations, the increasing number of public botanic gardens and private collections, the establishment of numerous agricultural schools and agricultural experiment stations over the civilized world, testify to the vast economic importance attached to the study of plants. Some departments of this study, as *e. g.*, that of the diseases of plants, have had an extraordinary development during the past few years. As most of our native plants, with the exception of trees and grasses, have little economic value, the interest that centers in them is one arising from sentiment rather than from any other consideration. And it will be admitted freely, I think, that sentiment is a very powerful factor in influencing conduct.

The child wanders through the lush grass in the meadows and fields and fills its hands with the flowers of buttercup and daisy, or, in earlier springtime, while the grass is yet upspringing, revels among broad blue spaces of the bird-foot violet, and lays in its memory the foundations of those palimpsests whose deciphering will be one of the pleasures of later years. Among the pleasing memories of our early years, when life is so full of wonders and the days and the years so full of life, there are few more pleasing recollections than those of the scenes which in some way are connected with the plants and flowers that have left so deep an impression on our memories.

Perhaps behind the little school-house, where, in the seeming endless summer days, we droned over the mysteries of the beginnings of learning, while through the open door the sunlight streamed in and the birds' songs came, and the multitudinous hum of insects, there was an oak-grove. There in June days we used to find the purple lady's slipper. This stands out distinct, vivid as lightning in a summer night. There may have been others, but they have left no impression. Yet the sight now of the purple lady's slipper sends the memory back through the flight of years and fills the stage again with its busy actors, and gives a special interest to this flower wherever seen.

The sights and sounds of early youth have a glamour about them which nothing in later years can destroy.

It is for this reason that emigrants love to carry with them to their new homes on the other side of the world some of the plants and animals associated with the old home. Froude tells us that in New Zealand the sweet-brier was long ago imported by the English missionaries, who liked to surround themselves with the pleasant home associations.

There is no prettier picture in Charles Reade's "It is Never too Late to Mend," than that of the thirty or forty rough fellows, mostly gold-diggers, who have gathered on a Sunday morning at a squatter's house to listen to a caged sky-lark.

"The song swelled his little throat and gushed from him with thrilling force and plenty, and every time he checked his song to think of its theme, the green meadows, the quiet, stealing streams, the clover he first soared from, and the spring he sang so well, a loud sigh from many a rough bosom, many a wild and wicked heart, told how tight the listeners had held their breath to hear him; and when he swelled with song again, and poured with all his soul the green meadows, the quiet brooks, the honey clover, and the English spring, the rugged mouths opened and so stayed, and the shaggy lips trembled, and more than one drop trickled from fierce unbridled hearts down bronzed and rugged cheeks.

"And these shaggy men, full of oaths and strife and cupidity, had once been light-headed boys and strolled about the fields with little sisters, and little brothers, and seen the lark rise, and heard him sing this very song.—And so for a moment or two, years of vice rolled away like a dark cloud from the memory, and the past shone out in the song-shine; they came back, bright as the immortal notes that lighted them, those faded pictures and those fleeted days; the clover field, the cottage, the old mother's tears when he left her without one grain of sorrow, the village church and its simple chimes; and the clover field again hard by in which he lay and gambolled, while the

lark praised God overhead; the chubby playmates that never grew to be wicked, the sweet hours of youth—and innocence—and home."

One never realizes how varied and abundant the local flora is until some special opportunity or special interest leads him to investigate carefully. Then, as the eye sees what it is trained to see or what it is looking for, new and farther reaching vistas are constantly opening. Even when the more conspicuous flowering plants are quite fully known, there is a larger world of flowerless forms, such as ferns, lichens, and fungi, and lower still, a world of algæ, desmids, diatoms, the portals of which we can enter only with the microscope, where the forms are of exceeding beauty and the problems concerning life are very enchanting. And just as the improvement in telescopes and in methods of photography have shown the existence of many heavenly bodies formerly invisible, it may be that we shall yet learn of vegetable forms still more minute than any yet discovered in which some of the mysteries that surround life may be made more plain.

The flora of Worcester County, so far as it has been recorded, contains 1,098 species and varieties, of which 55 are ferns and their allies. This is an addition of 286 during the last ten years. The record is by no means complete; in fact, such a record by the nature of the case can hardly be made complete, owing to the constant additions, permanent or casual, which are made through the channels of trade; *e. g.*, *Galinsoga parviflora*, Ruiz and Pavon, an immigrant from South America, is making itself at home in various parts of the United States, among them our city and county. In the same way, one of the hawkweeds, *Hieracium aurantiacum*, L., is becoming a pest on lawns in Winchendon. And, again, there are some plants, native but not abundant, at home in deep swamps, which have long escaped notice. I had supposed that of the four species of *Gaylussacia*, or huckleberry, described in Gray's Manual, only two could probably be found in our county, the black huckleberry and the dangleberry, until one day last June, a third species, the dwarf huckleberry, *Gaylussacia dumosa*, Torrey and Gray, was brought to me from Northboro, where it was reported to be quite abundant.

Dr. Bigelow in the third edition (1840) of his "Florula Bostoniensis," mentions only one locality for it, in the edge of Richards' Pond, Brookline; and G. B. Emerson, in his now classic work on the trees and shrubs of Massachusetts, refers to it as rare, and mentions one locality, Manchester. Both of these authors put it in the genus *Vaccinium*, from whence it was transferred by Torrey and Gray to *Gaylussacia*. It may be of some interest in this connection to recall

the fact that the ancestors of Asa Gray, the most distinguished American botanist, were among the early settlers of Worcester. In his autobiography he says: "My great-great-grandfather, John Gray, with his family, among which was Robert Gray, supposed to be one of his sons, emigrated from Londonderry, Ireland, to Worcester, Mass., being a part of a Scotch-Irish colony. The farm they took up was on the north side of what is now Lincoln Street." This was in the year 1718, four years before the incorporation of the settlement as a town. Moses Wiley Gray, one of the grandsons of John Gray, married in Worcester and afterwards moved to Templeton, and later to Oneida County, New York, where Asa Gray, one of the grandsons, was born in 1810. In the early records of Worcester the name Gray is of frequent occurrence.

The great order, Ericaceæ, or Heath family, to which the huckleberries already referred to belong, is well represented in our local flora. Of the twenty-six genera described in the Manual, which includes the district east of the Mississippi and north of North Carolina and Tennessee, all but nine are represented in our flora; and of the sixty-nine species, thirty-five are also found here. On some accounts this is one of the most important families represented in our flora.

It contains the two genera, Gaylussacia and Vaccinium, which yield plentiful supplies of huckleberries, blueberries and cranberries, and such genera as Kalmia and Rhododendron, which furnish some of our handsomest shrubs.

One of the most interesting native plants of this order to me personally is the Labrador Tea. I had known of it long before seeing it. In Emerson's "Trees and Shrubs," I had seen his reference to Hubbardston as one of its localities. One of my friends who had landed on the coast of Greenland, where flowers of great delicacy bloom at the foot of glaciers, had shown me sprays of it in leaf, but without blossoms; and at last another friend brings me some which he had found growing naturally within three miles of this hall. It must have been much more abundant formerly. Soon after the passage by Parliament of the famous act imposing a duty upon tea and some other articles imported into the American colonies, a meeting was held in Boston to take action concerning the use of such taxed articles, and a resolution was passed to refrain from using them. The execution of the resolution against tea required the aid of the female part of the household. A female convention accordingly assembled in Boston and agreed to discontinue the use of the taxed tea and to

substitute a native shrub, Labrador Tea, an inhabitant of the meadows and swamps. The patriotic ladies of Worcester concurred in the resolutions of the women of Boston. But there were royalist women in Worcester who loved both their tea and their king, who had influence to cause these resolutions to be set aside. Lincoln's History of Worcester gives the cause assigned for this action.

Another of the native plants which dates its name from that time is the New Jersey Tea, *Ceanothus Americanus*, L., its name implying its use. This, unlike the Labrador Tea, is quite abundant in our neighborhood. It does not belong, however, to the Ericaceæ. The water andromeda, *Andromeda polifolia*, L., is kindred in interest with the Ledum. Andromeda is a famous name in classic poetry, in art, in astronomy, as well as in botany. Her name may not just now be on as many tongues as Trilby's, but it will probably survive longer.

The classic story of the beautiful maiden, Andromeda, chained to a rock on the seashore to await the coming of the dreaded sea-monster which will devour her, that so the sin of her mother may be expiated, is as well known to the student of English literature as to the student of Greek and Latin. There is no finer specimen of hexameters in English poetry than Charles Kingsley's poem, Andromeda, or any more interesting tale in Morris' Earthly Paradise than the "Doom of King Acrisius," which contains the same story. But Andromeda was rescued from this hard fate by Perseus, returning from his quest for the head of the Gorgon, and he claimed her for his bride. The astronomers transferred their names with those of her father and mother, to groups of stars near each other in the northern sky. There, whoever will look up on a clear night may see Andromeda spreading her long white arms in the height of the æther, and near her are Cepheus, her father, and Cassiopeia, sitting in her ivory chair as she plaits ambrosial tresses. Linnaeus tells us that, as he contemplated this lovely plant in the swamps of Lapland, the poetic legend filled his mind and made the name seem most applicable. I have made search and inquiry in all parts of the county, but Westborough is the only town as yet where I have succeeded in locating it, and that only last October.

Before that time its nearest habitat known to me was Whitehall Pond in Hopkinton, which is just outside the line of our county. It is one of the native shrubs which is well worthy of cultivation, for its intrinsic beauty both of flower and foliage. Who knows in what grateful way it might repay the labor devoted to it?

Linnaeus raised to Peter Kalm, one of his favorite pupils, a monu-

ment more enduring than brass and nobler than the royal structure of pyramids when he named for him the exclusively American genus, Kalmia or laurel. The name of Kalm is thus preserved safe from the effects of destructive storms or the flight of time. His fame cannot wholly die so long as, all over the civilized world where the Kalmia grows naturally or as an exotic, his name is perennnially upon men's lips. In the whole of North America, north of Mexico, there are but five species, three of which are abundant with us, the other two being confined to lowlands along the coast from Virginia to Florida. The pale laurel, *Kalmia glauca*, Ait., comes into bloom early and escapes observation, except from those who are seeking it. It is followed by the sheep laurel, *K. angustifolia*, L., and the mountain laurel, *K. latifolia*, L., perhaps the most conspicuous flowering shrub in June. Kalmia blossoms have a special adaptation for cross-fertilization that is worthy of notice. In the flower-bud, each of the ten anthers is lodged in a small cavity, and the filaments are nearly straight; but when the saucer-shaped corolla is fully opened, these filaments are curved outward and backward, resembling a curved spring. The anthers, unless aided, cannot get out of those little cavities or shed their pollen. Humble-bees in search of nectar, touch the filaments, brush against them with sufficient force to dislodge the anthers, when the filaments spring back with considerable energy and throw the pollen from the two orifices at the apex of the anther cells. Some pollen may be thrown in this way upon the single small stigma at the tip of the style, but some of it is thrown upon the underside of the insect's body, from which a part at least is brushed off upon the stigmas of other flowers. Nature is most prodigal of pollen. She is profuse in her expenditure of resources to accomplish her ends. In fair weather we shall find few of the fully opened flowers that have not been visited by some insect, as is shown by the now dislodged, incurved and relaxed stamens.

Our woods present no more charming sight than a path lined on both sides with this handsome shrub in full flower.

I have now in my mind such a one. It should be seen on one of the rare June days. Far off through the waving branches overhead may be seen the pale blue sky, flecked here and there with a thin streak of cloud; butterflies are flitting slowy by; the caw of a distant crow, or the scream of a bluejay near at hand, or the twitter of the smaller birds tell us of the bird life around; and on each hand are these beautiful pink or white flowers in such profusion that we scarcely know which to pluck or which to leave behind.

Kalm dedicated to Dr. Gaulthier of Quebec a genus of plants which embalms his memory, commonly called wintergreen, or checkerberry, or partridge-berry, or box-berry, but known to botanists as *Gaultheria procumbens*, L. This, too, is a peculiarly American plant, and is well known by its pleasant aromatic flavor, its shining evergreen leaves, its delicate flowers, and its scarlet berries. It is very generally distributed throughout New England, where it can enjoy the protection of evergreen as well as deciduous woods, and is about as well known to young persons as any of our native plants, not excepting the trailing arbutus. This is, however, only one of eleven species of low evergreens of this family which help to carpet the forest floor. Besides it are the well-known trailing arbutus, the creeping snowberry, one of our rarest species, the bearberry, the two species of chimaphila or pipsissewa, the four species of pyrola or wintergreen, and the one Moneses or one-flowered pyrola, one of the daintiest of its tribe.

A springtime would hardly seem like itself if we did not see in the early days the fair, white racemes of the leather-leaf, *Cassandra calyculata*, Don, mingling with the purple blossoms of *Rhodora*; or if, in the latter days of the spring, we did not see the fragrant and charming *Leucothoe* near by the pink azalea, *Rhododendron nudiflorum*, Torr. The expansive beauty of the *Rhododendron maximum* is meet for the tropic splendors of late June or early July.

We are proud of our representatives of this great order. This pride does not prevent us from appreciating the beauty of the heath or heather of Great Britain when it empurples the hills and the moorlands.

Should it be our fortune ever to visit the Cape of Good Hope and see its hundreds of forms belonging to this great family, we should appreciate them the more from their kinship with our forms. The exotics shall be partners with the natives in the great enterprise of making the world better and brighter, of filling it with sweetness and light. They should not be rivals. There is no need or place for such rivalry. The world is wide enough for both, and better because both are in it. May they both flourish!

In the early spring, while the hordes of insects are not yet astir, but while the winds are never sleeping in their efforts to restore the equilibrium of the atmosphere disturbed by the northward progress of the sun, the wind-fertilized or anemophilous flowers open. The numerous catkins of the alders, hazels, birches, oaks, walnuts, butternut, beech, sweet-fern, sweet-gale, bayberry, hornbeam and hop-

hornbeam, which were formed during the preceding summer, now scatter their fertilizing pollen freely and abundantly to the wooing breezes. Such flowers lack the color and the perfume which render so many insect-fertilized flowers so attractive. Not depending on the visits of insects to secure fertilization, they do not need the attractive charms which would bring them. They do need projecting stamens laden with pollen, most of which may be wasted, but enough will remain to accomplish the desired purpose. The fact that the leaves of these trees and shrubs are not yet expanded, would seem to indicate that Nature does not wish to interpose unnecessarily any obstacle to the pollen on its journey to the waiting stigma. But the general interest does not lie in such flowers as these which contain the essential organs but lack a showy calyx or corolla.

Three or four flowers of spring seem to have most of the beauty of the season wrapped up in themselves. What is more dainty than the pale blue blooms of the hepatica, or more evanescent than the sepals and petals of the blood-root, or more delicately fragrant than the pale pink flowers of the trailing arbutus. To be seen at their best, however, they must be seen in their native haunts, beside the babbling brook, among the lichen-covered bowlders, under the pines, but always in the free, open air with the bright sky overhead. The spirit of Emerson's little poem, "Each and All," enfolds them. They cannot be separated from their natural environment without losing some of their natural beauty.

In the deep woods, it may be, we shall find late in April the early yellow violet, whose praise Bryant sang, probably at Cummington, in the interval between the composition of those two matchless poems, "Thanatopsis" and "Lines to a water-fowl." Near by it should be seen the small yellow flowers of the yet leafless stems of the leather-wood, *Dirca palustris*, L. The dog's tooth violet was the first flower I was able to identify by a careful study of its structure. Till then I cannot say that I had really seen it, although since then I have seen meadows all yellow with it. Perhaps my eyes had been before like mirrors, which reflect the light and images of objects, but themselves see nothing. I look for it now every spring. If I should not see it, something would be wanting to the perfect charm of that delightful season.

One of the shrubs or small trees which cannot fail to attract attention by its abundance in the yet leafless woods is the shad-bush or June berry. Its numerous white flowers in drooping racemes are then far seen and show the large number of individuals, which would

not be expected later in the season, when the other shrubs and trees are in full leafage. With the shad-bush we associate the troop of violets, five or six species of which may easily be found in the early May days.

Not many of the earlier flowers of the year are classed among the weeds. The weeds start early enough, but realizing that they have all summer and autumn to ripen in, they do not hurry to bloom. Perhaps they escape notice and many mishaps by lying low until the more useful vegetation has attained a sufficient growth to overshadow and protect them.

The most conspicuous weed of spring is the dandelion. Its mode of growth is worth more than a passing notice. In the animal world it would seem to imply a great deal of instinct or inherited memory, or whatever we choose to call it. It opens its flowers at first on a short scape or flower-stem, which lengthens during blossoming. After all the flowers have been expanded long enough to ensure fertilization, the inner involucre closes, and the cells on one side of the stem contract, drawing it down almost to the ground. In this position the fruit ripens, and at the same time the slender beak of the achenes elongates, carrying up with it the crown of soft white hairs. When everything is ready for the distribution of the fruit, the cells of the stem expand, the stem stands erect, the involucre is reflexed, and the achenes or seed-like fruits, with the pappus displayed in an open globular head, are ready to be carried by the lightest wind to form a colony away from the parent plant.

Within a week of each other, sometimes before the middle of May, the shepherd's purse and the low spear grass will be found in bloom, perhaps both close together. I look at them with an added interest since I read Sir J. D. Hooker's "Himalayan Journals" a few years ago. The following quotation contains one of the best expressions of the delights of scientific travel, and that shall be my excuse for quoting it in full.

He is writing under date of November 25th, 1848, on one of the passes of the Himalayas in East Nepaul, at an elevation of 13,000 feet. He says: "Along the narrow path I found the two commonest of all British weeds, a grass (Poa annua) and the shepherd's purse. They had evidently been imported by man and yaks, and as they do not occur in India, I could not but regard these little wanderers from the north with the deepest interest. Such incidents as these give rise to trains of reflection in the mind of the naturalist traveller; and the farther he may be from home and friends, the more wild and

desolate the country he is exploring, the greater the difficulties and dangers under which he encounters these subjects of his earliest studies in science, so much keener the delight with which he recognizes them, and the more lasting the impression which they leave. At this moment these common weeds more vividly recall to me that wild scene than does all my journal, and remind me how I went on my way, taxing my memory for all it ever knew of the geographical distribution of the shepherd's purse, and musing on the probability of the plant having found its way thither over all Central Asia and the ages that may have been occupied in its march."

Every one familiar with the native flora must have similar, if not quite as striking, experiences, if he has travelled far from home. Years ago I found the enchanter's nightshade, *Circaea alpina*, L., among the rocks of "Purgatory" in Sutton. I had something of the feeling expressed by Hooker, when I afterwards saw it growing in a similar situation in the "Trossachs" in the Scotch Highlands.

Of the royal families of plants, those remarkable for their great number of species, beauty or usefulness, such as the palms, the ferns, the compound flowers, the grasses, the leguminous plants, we have many representatives of all but the first. The palms, a tropical and sub-tropical family, have no representative so far north of the Equator, although some species grow on the mountain-sides within the tropics, which would seem to suggest an ability to adapt themselves to a varied environment. While the ferns reach their greatest development, both in size and in beauty, within the tropics or near by, many of these beautiful genera have one or more representatives in our own flora. In my friend's greenhouse I shall find quite a number of species, delicate and graceful, of the large genus Adiantum. It adds to my interest and pleasure in our one native species, the maiden hair, to know that it belongs to so good a family. We will bear in mind, too, that the exotic species which we find in cultivation are the result of careful selection during a series of years of the species best adapted for that purpose. If we can have only one species of climbing fern (Lygodium), we are thankful for that, and sorry for our neighbors farther north who are denied this privilege. We have something of the best there is along nearly every line.

To a native of the tropics the palm family is undoubtedly the royal family. To a native of the Temperate regions the grass family has the same high rank. No family of plants contributes so much to give a pleasing aspect to the landscape. Each of the grand divisions of the world has its large characteristic grassy plains, the prairies of the

Mississippi valley, the pampas of South America, the steppes of Europe and Asia and the similar lands of Africa and Australia.

No other family has greater economic value. Through centuries of cultivation, some of them have been developed into the staple food-plants of the world. The teeming millions of southeastern Asia cannot starve so long as the sugar-cane, rice and bamboo flourish; nor the teeming millions of Europe or America so long as the earth brings forth its bountiful harvests of wheat, corn, rye, oats, barley and fodder grasses.

Most of the cultivated grasses are natives of the Old World, but are widely scattered over the New. The New World in return, has given some gifts to the Old, the greatest of which is maize. Cultivated in the United States, over nearly 80,000,000 acres, it is the largest arable crop grown in any country, the crop of a single year in measured quantity exceeding the entire wheat crop of the whole world. What more fitting floral emblem for the great Republic than this kingly plant whose grain is of the color of gold, which is grown to some extent, in every State and Territory in our Union, and in almost every county in which agriculture is carried on! The grass family is probably the most widely diffused over all the habitable parts of the globe, reaching the outposts of flowering plants, both in the polar regions and near the snow-line on high mountains. About 3,500 species have been already discovered and described, of which about 700 are found in the United States, and 80 in our Worcester County. In the early history of this country, particularly in the northern States, while the settlements were scattered, the native grasses and the natural pasturage were sufficient for the needs of the population. Afterwards, grasses well adapted for cultivation were imported from the mother country, and now cover large areas. Nearly a third of our grasses have been introduced, some by design, some by accident; all are naturalized. The humbler grasses may be proud of their noble kinship and of their family reputation. There are few weeds among the grasses. Some of the grasses are valued for ornament.

Quaking-grass, *Briza media*, L., with its showy drooping spikelets on delicate pedicels, is an ornament to many an upland meadow; oat-grass pleases with its slender drooping panicle; velvet grass attracts attention by its pale color and soft downy appearance, and *Brachyelytrum aristatum*, which has no common name that I know, probably because it is native and largely unobserved by the common people, who give common things a common name, will long help to decorate the margin of rocky woods.

I think that formerly, the native plants, or rather those growing wild, were better known by most people than now. The development of civilization has a tendency to gather people together in constantly enlarging communities, where the competition of business life absorbs most of the attention; but a stronger reason, probably, is the change constantly going on in medical practice. In olden times, there existed a real and sincere art of healing, which rested mainly upon the knowledge of herbs. There was some quackery which attached itself to the genuine art, false notions which had powerful effects. Mineral and chemical remedies are comparatively modern. The vocabulary of our language proves this. The term *drug* is from the Anglo Saxon *drigan*, to dry. The first drugs were dried herbs; so that the study of plants naturally was identified with medicine by long tradition. When, in the 16th century, the chief cities of Europe established gardens for the study of plants, these gardens were called Physic Gardens, a name not long extinct.

Our flora contains a number of plants which have had more or less repute. The first ship loaded from what is now Massachusetts, carried to England a load of sassafras. In the list of our plants of this character we may include the liverleaf or hepatica, meadow rue, goldthread, barberry, pappoose-root, blood-root, violets, mallow, toothache tree, buckthorn, agrimony, hamamelis, caraway, ginseng, fever-wort, thoroughwort (a satisfactory and suggestive name), elecampane, yarrow, wormwood, coltsfoot, chiccory, lobelia, Indian hemp, vervain, pennyroyal, catnip, motherwort, self-heal, plantain, slippery elm,—but I cannot exhaust the list. Some of these are native, some naturalized, but now fully at home.

In our great number of species there are many that are beautiful and worthy of cultivation. Some of them are sought for this purpose in Europe. It is natural that the common should appear to have less value than the rare or exotic.

It is the fate which plants share in common with all objects of human consideration. But on that account our local flora is not the less worthy of a share of our interest; it will, in fact, enlarge our interest in the exotic flora of the greenhouse and in the botany of the world as a whole. The material for such study is abundant and cheap. There will always be some people who will appreciate it fully.

DISCUSSION.

Mr. Draper. I feel as if I was stepping upon unfamiliar ground in trying to enter into a discussion which this paper would naturally

suggest, but I wish here and now to voice my appreciation of the work that Mr. Jackson has done for the botanical interest and education of the City of Worcester.

We have not forgotten his work rendered here several years ago, nor his first published list of the Flora of Worcester County. And now he comes forward and adds to this work, standard works, few of which are published in our cities.

A person who is not conversant with botanical knowledge, can at the proper seasons familiarize herself or himself with a great deal of the natural flora of our vicinity. And I, for one, certainly appreciate and voice the sentiment of all true lovers of nature.

I think Mr. Jackson must feel to-day that, for an inclement day, his audience shows their appreciation of his work already rendered, and the things shown in his paper. But you and I, Mr. President, notice here familiar faces that are constant attendants at our discussions on other themes. I am confident that there are others here who are far more deeply interested in this subject than the one who is now addressing you, and who, from early spring to late fall, are looking out and finding in their favorite botanical recesses, these little flowers and plants that have been described.

I claim that I have not the ability to draw these young ladies into the pleasant conversation and discussion as if they were in the classroom with Miss Tucker. I wish it were possible now that the meeting might take up an informal matter, and that they might question our speaker in an informal way and get the fullest benefit of the meeting, by discussing the native flora of this section.

Mr. Jackson. I want to give one illustration of the way in which a person gets acquainted with the native flora. Some dozen years ago a list of the plants I wanted to preserve was printed in the *Spy*, as often as they amounted to fifty.

A physician in this city, in very active practice, who had preserved the whole set, showed me one of those slips that he had cut out of the paper, and said that when the proper time came he would take out the proper slip for the season, and as he rode along through the country and saw a flower he was not familiar with, he would take out the slip, and by noting the day of the month he could in a great many cases tell what flower he had got, by seeing how near it was to the description on the paper, as he had not time enough to spare to analyze the plant. He said that he made out a great many of them by doing so. I think it adds very much to our interest in plants to see what somebody else thinks about them.

Inquirer. I would like to inquire what the Professor means by "upland meadow"? "I mean what is sometimes called pasture."

"I never found any Quaking Grass on high land; I have only seen it in low land, where it is damp and moist."

Chairman. It is unfortunate for the chair that he does not know some of the faces that are present, who could tell us something. I hope that they will have something to say without being called upon.

Dr. Hodge. I don't know whether I belong here or not, but I will try to make a few remarks. I am exceedingly glad to have the opportunity to thank Mr. Jackson for the book which I have read with so much interest this winter, and I encore Mr. Draper's remark on getting out a book of that kind. When your President called for a botanist I certainly could not respond, and I am very sorry for it, but there are not very many botanists in the country that I know of, and whether the fault is in the way that we are trained in the schools, or whether the fault is in ourselves I won't stop to say. But I look upon this movement which Mr. Jackson has been forwarding in Worcester as one which gives to my mind the greatest hope of making everybody a botanist, and advancing to them the knowledge of the flowers and plants that they are treading on every day.

I remember the first time that I ever saw Kalmia. It was after I came to Baltimore for the purpose of finishing my university course, and the people there said I ought to go out and see the mountain laurel, and told me the place where I could find it. I don't think I was ever more surprised. I went out into the woods in the suburbs of Baltimore, and simply forgot all about lectures, laboratories, and life in general. I have often wondered why we don't have more of it in our gardens and walks. It is a beautiful bush. The specimens we see in the pastures are torn by the cattle and the boys.

It seems to me that we go a great way for shrubbery, which in the point of interest does not come within miles and miles of our native flora.

There is another meaning to the botanical movement which Mr. Jackson has made here, and that is, that the commonplace common things, if we only stop and look at them, are often in reality the most beautiful things we can find in the flora; and the fact that they are common, if our attention is not called to them in some such way, makes us overlook them. If we would only stop and look at them, we should see beauty in them which would make life have a greater meaning, instead of our simply passing over everything in the world about us.

I wish to thank Mr. Jackson again for the talk this afternoon, and the book he has written.

CHAIRMAN. Speaking of the common mountain laurel, I have perhaps a hundred plants which have been transplanted mostly from the woods and pastures, and I have not yet made up my mind that I know fully how to grow them well. But I am on the road; and if I should live a few years longer, I should be able to cultivate the laurel with success. I have some also which were imported; I don't mean come from foreign countries. Of course I would have to have some that were imported, and they seem to thrive well. I don't seem to see much difference in the bloom. I was in hopes of getting some of higher color than our native laurel, but I don't see much difference in the bloom; they are full of blossoms in their seasons, more so than the wild ones. It is a plant which, I think, gives the best effect in the winter season, when we see the leaves under the snow. It has a leaf that does not die or wither in the winter season, and I think there is no plant that is so generally overlooked, because, I suppose, it is so common that it is not thought worthy of cultivation, and almost everyone can adorn his grounds and premises with laurel with very little care.

There is another plant Mr. Jackson has spoken of, and which I take a little pride in, and that is blood-root, and probably I can show a larger cultivation of blood-root than anyone in the Commonwealth; not that I can give myself any credit for it, for it comes up spontaneously. When it is in bloom, there is nothing on the premises that shows off as well. I have cultivated nearly one-half acre of it.

INQUIRER. Have you ever cultivated any *Andromeda?*

I have four varieties which give me a great deal of pleasure. It thrives well on high ground, and it has a beautiful leaf, so white on the under side.

INQUIRER. I would like to inquire the general appearance of the laurel when it is cultivated?

When the laurel is in its best condition, it not only has a large leaf, but the perfume is very profuse; much more so than when we see it in its wild state.

FROM THE AUDIENCE. *Mr. President*,—I am aware that you are somewhat abashed by the array of young ladies before you, and you have not discovered the presence of the botanist,—the teacher at the Normal School.

MISS TUCKER. I can only say, that I have enjoyed very much listening to Mr. Jackson; and I fully agree with him in his defending the

native shrubs as well as the trees for cultivation. I have made great use of Mr. Jackson's list of the plants of the county, for several years past, and I feel greatly indebted to him for his contribution to us in the works of that kind, and I think as all the rest of you do.

Mr. Watts. *Mr. President, Ladies and Gentlemen*,—There is one thing my attention was called to in the essay, and that was, when he made the remark that people at present don't seem to understand as much about the flora of the country as the people of the old times did; and he accounted for it in the way that they used those herbs for medicines and for medicinal purposes.

Indeed, I can well remember that about thirty or forty years ago it was my lot to be cast with some of those older people, and my recollection dates back to that time. And, now, when I find any particular plant that I cannot remember the name of, as the older people used to give it, as soon as I can find out the common name of it, I turn to the botany, and there discover its proper botanical name.

It is very interesting to note in regard to common names, that if there is any particular common name for a flower in one part of the country, other parts of the country will call it by another; and I tell my children to impress these names on their minds, and then it is easy to turn to the works of the botanist and discover the technical name.

I remember once one of the ministers of Cherry Valley drove up to my house, and picked some flowers. The children he had with him were studying botany, and when he rode up to the house, he called my attention to a flower and asked me if I knew what it was. I told him "yes." He said, "What do you call it?" I said, "I call it ground-nut. Do you want anything more?" He said, "I would like the botanical name?" I turned to Gray's Botany and looked it over, and found that ground-nut proved to be *Aralia*. He said that he had never been able to find anyone that could tell him the name before.

My boy picked up some specimens in our neighborhood, and carried them up to the Academy, and the teacher who was teaching botany there could not tell him the name of it. The boy knew it was wild ginger and there was no reason why he (the Prof.) should not know what it was. He analyzed it, and discovered what it was. It is only those who have hunted for wild ginger particularly, who would know what it was. There is no one here probably, who has ever seen the blossom of it.

I believe in these discussions, and the bringing out of these ideas, so as to make it interesting to the people. They must keep their eyes and ears open and hear what is said, and then retain it.

Mr. Jackson. I think there is one drawback in the minds of a great many people who study botany, and that is the difficulty they find in learning the hard names.

When I started in on the subject, I found that I could learn only one at a time, but after a while I had a long list of them. I took interest in the plants and remembered them merely because I wanted the botanical names, and could therefore retain them. The botanical names are not so hard as to discourage anyone. The shorter names are not so hard but that children learn them. One of the first things one wants to know in the study of botany, is the name of the plant he has in mind, just the same as he wants to know the names of the people he meets. He takes an added interest in every one whose name he knows, especially if it is a well-known name. People sometimes think they cannot learn the names themselves, and therefore discourage others. It is a very simple subject after a time.

28th February, A. D. 1895.

ESSAY

BY

BURTON W. POTTER, Esq., Worcester, Mass.

Theme:—Forestry Preservation.

A succession of several dry seasons makes people begin to speculate on the cause thereof. Some say there have always been droughts and water famines, and there always will be, do what we may. Others say they are made by man and not by nature, and therefore they may be prevented by human action. Providence is frequently held accountable for many things it is not in the least to blame for. We sometimes bring sickness, disease, and poverty upon ourselves by the violation of the ordinary and well-known rules of health and economy, and then as an excuse for our misconduct and laziness we attribute such calamity to a visitation of God. Sickness is always with us; but that does not excuse us from trying to live in accordance with the laws of health, in order that we may burn out and not be snuffed out. The poor we have with us always; but that is no reason why we should not strive for good laws and right living, in order that the number of the poor may be as few as possible. God is not responsible for results in human life until we have exerted, to a reasonable extent, every moral, mental, and physical faculty at our command. When the experiences of ages teach us that the proper condition of the climate, soil, and atmosphere depends upon the right proportion of forests to arable land, we should be careful not to disturb the equilibrium by cutting off too much of our forests. The best scientific authorities maintain that nearly every country needs to be covered by forests over at least one-quarter of its surface. It is a well-established fact that the amount of rainfall in a country depends, in great measure, upon the area covered by forests in that country. There are some parts of the earth that used to have a fertile soil, a moist climate, and streams always full, but seldom swelling to disastrous

floods, which are now dry and barren, with infrequent rains and dusty river channels, along which, after a rare storm, impetuous torrents rush with destructive force for a short time, and then dwindle rapidly and soon disappear, leaving the stream-beds as dry as before.

Those regions, in the days of their happy estate, were well wooded; while now, in the days of their desolation, they are almost destitute of forests.

In ancient times Syria and the Holy Land, and all the region on the southern shores of the Mediterranean, from the River Nile to the Straits of Gibraltar, were fertile and well-wooded countries; the very garden territories of the earth. The hills were clothed with groves of olive, sycamore, cedar, and palm trees. The low lands produced, in rich abundance, wheat, barley, figs, pomegranates, milk, and honey. Everywhere springs gushed forth from the well-watered soil, and brooks and rivers flowed through the valleys. In those early days a teeming population flourished upon the productions of the soil, and carried their civilization into the surrounding countries. But now the hillsides are no longer covered with forests, and exhibit bare and precipitous rocks, while dusty and burned-up soil covers the low lands, where frequently not a vestige of vegetable or animal life can be seen for hundreds of miles around.

When the tree-hating Arabs and Moors overran these countries, they cut down and burned up nearly all the trees then standing, and thereby produced a change in climate and atmosphere which has made this primitive garden soil a desolate waste.

But the southern and eastern shores of the Mediterranean are not the only places which have suffered by the destruction of forests. Everywhere, the world over, the greed of men, when unrestrained by law, has cut down the forests without stopping to consider the consequences. And many tracts of land which were formerly partially covered with stately forests, and where the soil was well watered and fertile, are now almost arid wastes. Austria, as a whole, is a well-wooded country; but its shore provinces around the Adriatic Sea are almost denuded of forests, and the land is little better than a desert. In ancient times the hardwood timber of these provinces supplied the Romans with materials for their ships and buildings; and at a later day this timber, in large quantities, was used for ship-building and pile foundations in Venice, when she was in her glory and queen of the seas; and in the sixteenth and seventeenth centuries the merchants of Holland and England purchased and carried away the rest of it. After the forests had disappeared the native inhabitants dug up the

stumps and roots for firewood, and grazed the treeless land with sheep and goats, until there was not a vestige of forest growth on the plains and hillsides of a once beautiful country. The climate, which was naturally mild and temperate, became changeable and unreliable, landslides and avalanches became common, the mountain brooks dried up, and the rivers became shallow. The whole face of the country was changed from its former rich and fruitful condition to sterile plains, interspersed with stony and parched hillsides, populated with half-starved sheep and goats, and poor farmers.

Mauritius, in 1864 and before, was a mass of verdure, and was called the "pearl" of the Indian Ocean. The forests were cut off to gain space for sugar plantations, and then the rainfall diminished. The rivers and brooks dwindled down to muddy streams or dried-up basins; the water became stagnant in cracks, crevices, and natural hollows, while the equable temperature of the island entirely changed; drought was experienced in the midst of the ocean, and thunder-showers were rarely any longer witnessed. The lagoons, marshes, and swamps along the seaboard were no longer filled with water, but gave off noxious gases; while the river water became impure from various refuse.

To remedy this evil the Government caused the mountains and hills to be again covered with planted trees, and the rivers and streams resumed their former dimensions.

I might go on and show how the destruction of forests has injured the soil and climate of Spain, Southern France, India, and other places; but it is unnecessary to accumulate evidence on this point, for it is doubtful whether the earth itself would be habitable for man were it not for trees and forests. Unprotected by the shade of trees and the humidity arising therefrom, the scorching rays of the sun would be hard for him to bear. The air, unpurified by the process of tree growth, would be poisonous to him. The cold blasts of winter, unchecked by forest barriers, sweeping over the hills and through the valleys as water pours over a dam or through a sluiceway, would chill the life blood of the most vigorous, and sweep the entire race from the planet.

The rulers of the most enlightened governments have long felt that the preservation of a reasonable amount of forests is necessary for the increase of national wealth, the maintenance of a water supply, the equability of the climate, and the fertility of the soil. Nearly every government in Europe is now making laudable efforts to reclaim all unfruitful land by planting the rocky hillsides, the sandy dunes, and

the barren plains, with millions of young trees. Countless millions of young trees have been furnished gratis to the inhabitants of these desolate regions for planting, and experiment stations have been established at all central points for the raising of trees adapted to the climate and soil of those localities. When the people have been found indifferent to their true interest in this regard, they have been required by law to work a certain number of days each year in planting trees on land condemned and taken for that purpose, or to contribute an equivalent in money, to be used by the official foresters in the same work. But to the credit of humanity in modern life, be it said, a great many communities have taken hold of this work with zeal and energy, and much has been done to reclaim waste land and cover it again with trees of the best species. All this has a tendency to bring into re-existence, as it were, land which has seen better days; and every acre of land thus recovered secures to mankind increased happiness and sustenance upon the earth. It means new roads and cities to build, new farms to cultivate, harbors and rivers to improve and fit for navigation, schools to establish, and wood and timber to use in the erection of new dwellings, and the enlargement of warmth and comfort in those dwellings. Man, and not nature, made this waste soil to lie fallow for centuries, and now it is the duty of man to reclaim and rejuvenate it by replanting it with forest trees, and thereby restoring it to its primitive beauty and productiveness.

Without giving in detail the forestry laws of the different European nations, I will briefly state the general purport and scope of those laws and the measures the governments adopt to secure their wise and faithful execution. It is the aim of the governments to have about one-fourth of the entire area of the country covered with forests. There are three kinds of forests,— State, communal, and private; but the governments exercise full control over them all.

Pasturage is not allowed in the State forests, but sometimes hogs properly guarded are admitted for the purpose of destroying insects and their eggs. Poor folks, living in the vicinity, are generally permitted to gather and carry away for their own use, without charge, the dead branches, and the brushwood which remains unused when timber is cut for the market. They are also allowed to pick the berries and harvest the mushrooms. The people at large are allowed to frequent the State and communal forests, and to hold picnics therein, subject to the rules and regulations prescribed by the proper authorities. At certain seasons of the year portions of them are leased for hunting-grounds to individuals or societies, who are required to pay a fair compensation

for this privilege. When the trees are large enough for timber, they are cut under the direction of the official foresters, and the wood and timber is used by the State or the commune so far as needed, and the remainder is sold at market prices.

Sometimes fruit trees are planted in the forests and along the public roads, and the nuts and fruit thus raised are sold for the benefit of the State or the commune. The forest revenues are usually much larger than the forest expenses, and the surplus is applied to the repair of the highways or other public improvements.

The private owners of forests are allowed to occupy and manage them under prescribed rules and regulations, and to receive all the income therefrom; but they have to be very careful not to commit any trespass on their own land. They are not allowed to cut down their forests, wholly; and they must cultivate them in a manner not to endanger their growth or destruction. Sheep and goats must not be pastured therein, nor cattle, until the trees are of good size. The oldest trees and those most fully developed must be cut first, and sometimes an official forester must designate the trees which the owner is allowed to cut down. Barren spots and all unnecessary paths and gullies must be planted with suitable trees. The felling of trees must be in such a manner as to cause as little damage as possible to young growths or neighboring trees.

The supervision of all the forests of the State, the commune and private owners is entrusted to official foresters, who are appointed by the State and educated at forestry schools.

In addition to the forest laws, nearly every country in Europe has forestry schools in which exact knowledge of all branches of the science of forestry are taught. The special studies are zoölogy, botany, mineralogy, geology, physics, chemistry, climatology, the history of forests and their uses, tree culture and forest management, agriculture and political economy, road building, and the civil law relative to forest, hunting and fishing rights. All the official foresters are graduates of these schools, and they also serve an apprenticeship in the care and management of forests before they are entrusted with full forestry responsibilities.

These forestry laws and schools have been instrumental in preserving and increasing the forests of Europe. There for the past fifty years the forest acreage has been gradually increasing, until in many places one-fourth of the surface of the earth is covered by woods; while here there has been a constant and rapid decrease in our woodland area. Our census statistics show that some four million acres of

woodland disappear in this country every year, and that at the present rate of consumption our marketable lumber supply will be exhausted in fifty years.

It is not likely that the American people will allow their lumber supply to be entirely exhausted before they take some measures to check the wasteful destruction of their timber land; and then, too, the demand will grow less in the advancing years, as stone, brick, iron, and steel will undoubtedly take the place of wood to a large extent in the construction of buildings.

Nevertheless, for many years to come, the demand for lumber in this prosperous and growing country will be great; and unless something is done to preserve our forests, they will be cut off too rapidly for the best interests of the country. Already our rivers and creeks are dwindling in size, our summers are becoming drier, and our water supplies more difficult to obtain, and our manufacturing industries are compelled to resort more and more to steam and reservoirs for power to turn the wheels of their machinery.

These things are directing our attention to a more careful consideration of the uses and advantages of forests. Their existence and development are now recognized as important in the material world as money in the economic world. Their influence upon the climate and atmosphere is immense, though of such a quiet nature that it generally escapes our observation. They are reservoirs of water from which the atmosphere above and the ground below are constantly drawing moisture, and thereby the climate is made more equable and humid. They serve the double purpose,—of windmills to pump the water in the soil up into the atmosphere, when it is dispersed; and to retain it in the soil by their roots and their leafy moulds, where it is allowed to pass off gradually into the springs and brooks. It is one of the wonderful provisions of nature that every growing tree helps to purify the air we breathe. Vegetation lives and thrives on the carbonic acid and other ingredients in the atmosphere which are poisonous and injurious to animal life, and it has the happy faculty of working over these poisons and issuing in the place thereof pure oxygen, which is the most life-giving food for man and beast. When impure air passes through a forest, it comes out purer, if not wholly purified. In Italy and other places, towns which formerly were so unhealthy that nobody could safely live in them during certain seasons of the year, have become wholesome and pleasant places to live in owing to the planting of forests near them. And no doubt the destruction of forests has caused many places to become uninhabitable which in ancient times were the healthy and happy abodes of human beings.

A forest fertilizes and reinvigorates the earth. The roots penetrate the soil and thereby let in the air and water, while the deposit of leaves and branches enriches the ground and keeps it warm in winter and cool in summer. A hill unprotected by trees will soon lose its soil, unless frequently supplied with some fertilizing material to take the place of the soil which is washed away by every rain. And such is the renovating influence of a forest upon the soil, that a piece of worn-out land will become again virgin soil after it has been under cover of trees for a generation or two.

Trees also serve as conductors of electricity between the clouds and the earth, and cause the clouds to discharge their contents upon the earth. A thunder-cloud will pass unbroken over a barren and treeless hill, as if not deigning to notice or refresh such an unlovely thing, while it will pour down the cooling moisture of heaven, if its electricity is drawn off by a few tree conductors. It is well-known that the most fertile soil will not produce vegetable growth unless it is saturated with water either from the clouds or reservoirs; and inasmuch as the reservoirs themselves are largely supplied by rainfall, it becomes evident that an abundant rainfall is necessary for agricultural purposes in nearly all countries. Then, if trees are conducive to rainfall, they are as indispensable to man in the production of his food as in the purification of the air he breathes.

Forests are useful to the farmer, the horticulturist, and the stock-raiser. A forest, or even a cluster of trees when rightly situated, is a great protection to farm-buildings, fruit and grain fields, and pasture lands. When horses, cattle, and sheep have an opportunity, they will always seek shelter on the leeward side of trees on every cold and stormy day, and on the shady side every hot and sunshiny day. When stock is pastured out through the season, either in the East or the West, mercy as well as economy requires forest shelter for them.

Then again there is beauty as well utility in trees. They greatly enhance the beauties of a country, and no country can be beautiful in the highest degree without them. If the green hills and mountains of New England were stripped of their woods, the lovers of natural scenery and rural life would seek elsewhere the gratification of their tastes.

A lake or stream fringed with trees is more beautiful than a treeless one. A few sheltering trees wisely distributed upon a hill gives it added beauty and picturesqueness, even when its sides are verdant with green grass or covered with waving grain. Such a hill is always a beautiful object, and one which harmonizes exceedingly well

with a cultivated country round about. On the other hand, a bare and rocky hill suggests images of bleak and barren desolation, cold blasts, and parching sun. In fine, were it not for trees would there be much beauty in mountain, hill, or valley? For who can conceive of a beautiful landscape scene devoid of trees?

Now, if forests are so essential from every standpoint, what can and ought to be done for their growth and preservation? Happily in this part of the country nothing need be done for their growth except to give them a fair chance; for they spring up spontaneously, and grow with vigor in our valleys, and on our mountain and hill sides. But on the prairies of the West, where they are needed most, they have to be planted and tended for years in order to secure their growth and continuance. Under the delegated powers to the general government it is doubtful whether it has any authority to make forestry laws for the States, although it is charged with the duty "to provide for the general welfare of the United States." It has, however, without question, the right to preserve all the timber land on the public domain. There are now over three million acres in our great national parks, and about eighteen million in our national forest reservations. And intelligent measures should be taken to withdraw from the market all such public forest lands as are necessary to supply the head waters of the great lakes and rivers of the country. And efficient measures should also be taken to safely guard and suitably manage the forests belonging to the nation. The principles of forestry should be taught at West Point, or in a separate school of forestry; and the public forests and parks should be placed under the guardianship of the United States Army, or of trained foresters under the control of some department of the general government. If properly managed they could be made a source of large income to the government, and reservoirs of fertility to agricultural land, of water supply to rivers and lakes, and of health and protection to people and their domestic animals.

But while the national parks and forests are now, and will be more so in the future, of vast importance in the economy of the nation, yet under our system of government the main work of preserving and managing our forests will have to be performed by our State governments. Several of the States have already taken steps to foster the growth and preservation of their forests. Maine has enacted a good forest-fire law, and New Hampshire, New York, and Pennsylvania have established forestry commissions to examine into the condition of all forest covers, and to formulate plans and recommendation for future legislative action. By the new constitution of New York, no

more of the State forests are to be sold or exchanged. A National Forestry Association has been formed which has held several interesting and instructive conventions in different parts of the country. Many local forestry societies have also been organized which have done much in bringing about correct opinions on forestry matters. In Massachusetts the Legislature has incorporated the Trustees for Public Reservations, and in New Jersey Governor Werts, in a recent message to the Legislature of that State, recommends the appointment of a commission empowered to receive and hold any land or place they may deem to be worthy of reservation for public use. An act for a similar purpose is now pending in the New York Legislature. And thus by degrees a public opinion is being formed, which realizes that the hallowed places and the natural beauties of a country are worth preservation, and can be put to higher uses than those which are merely commercial. And in due time let us hope public opinion will become intelligent enough to warrant the enactment and enforcement of State laws allowing the confiscation of private land by eminent domain for forest reservations, or providing for the proper use and management of forests by their owners. A law requiring the owners of woodland to manage it in accordance with the principles of good forestry, may at first seem contrary to the long accepted opinions in this country and Great Britain, that the owners of land are entitled to the absolute and unlimited control of it. But in Great Britain this ancient doctrine is becoming impaired, by the enactment of laws requiring the owners of factories and buildings to provide them with fire-escapes and good sanitary arrangements; of laws allowing the courts to regulate and fix the rent of real estate between landlord and tenant; and of laws permitting municipalities to appropriate old buildings for the purpose of erecting in place thereof model tenement-houses.

And in this country the tendency of the law is to make the owner of real estate hold it as a trustee for society at large. He is not permitted to create, or allow anything like a private or a public nuisance on his premises. He is liable to have it flowed against his consent for mill or factory purposes. It may be taken from him upon fair compensation for a park or a cemetery, for a highway or a railroad, for a reservoir or a sewage farm, for a post-office or a school-house, or for some other public use.

The belief is becoming quite general that society treats one of its members very generously, when it allows him to fence in a certain portion of the earth's surface, and say to everybody, "keep off; this is

mine; I can occupy it exclusively while I live and dispose of it by will when I am dead." But when he seeks to go still further and contends that he has the right to use it in a way that is detrimental to the public good, if he sees fit so to do, he is trenching unduly upon the rights of society; for surely the earth belongs to the race rather than to individuals, and society has the right to regulate and prescribe the terms and conditions upon which individuals shall occupy certain portions of it. There is no more hardship in requiring the owners of woodland to manage it in accordance with the principles of good forestry than there is in requiring tenants of agricultural land to carry it on in accordance with the principles of good husbandry. In the long run, it would be beneficial to the owners of woodland to be compelled by law to observe rational forestry rules in its management.

It is not likely, however, that we shall have immediately State forestry laws; but it is the immediate duty of every patriotic and intelligent citizen to inculcate right sentiments on the subject, and to encourage the proper treatment of forest land. The wise treatment of woodlands is already a practical and important question. Should the cutting be clean or partial? When the trees are of a uniform size and of a species that will sprout from the root, and of a kind chiefly valuable for fuel, there would seem to be no objection to clean work; but when the trees are valuable for timber and in various stages of growth, it would seem to be better to cut out the ripe ones by degrees, in such a way as not to injure those remaining, but rather to increase their growth by giving them more room and light. If the trees are thicker than they can grow to maturity, or to a size suitable for timber, then the inferior ones should be removed, in order that the remainder may have the entire nourishment of the soil and a monopoly of the sun and air.

Forestry should be taught in colleges, and especially in the agricultural schools; and the love of trees should be instilled into every human heart. Multitudes of modern people seem to find great satisfaction in wild and grand scenes by the seashore and in the mountains, who apparently find no delight in the scenic beauty of the woods and the landscapes of their every-day life. But the true lover of nature sees beauty in the common things around him. He finds tongues in trees, and is able to read a lesson in the lily of the field, the grass on the greensward, and the leaf on the tree.

In order that people may be educated to love trees and forests, let village and rural improvement societies be multiplied; let Arbor Days be well observed and utilized; let public parks be established where the masses can find outing ground for pleasure and recreation; and let

every farmer be persuaded that he can use his rough and waste land for no better purpose than for the growth of trees. Much of our soil is unfit for pasturage or cultivation, which would raise forests, and thereby would produce something of use to coming generations. It has been said that he who makes two blades of grass grow where only one grew before is a benefactor of his race; and of all the pursuits connected with the interests of mankind, what can be the source of more true and disinterested happiness than the knowledge that one has been instrumental in changing a waste and unproductive piece of land into a scene of umbrageous and waving beauty! Cicero speaks of tree planting as the most delightful occupation of advanced life; and Sir Robert Walpole once said that among the various actions of his busy life, none had given him so much satisfaction in the performance and so much unsullied pleasure in the retrospect, as the planting with his own hands many of those magnificent trees that now form the pride of Houghton.

But I need not seek in history for testimony in behalf of tree planting, for there must be some men and women in this audience who can testify from personal experience of the joy and benefit of planting trees.

I appeal to those of you who have planted trees with your own hands and watched their growth and expansion from day to day until you have become familiar with every limb and all their varied aspects in sunny and in stormy weather, to say whether you have not already been paid a thousand times for setting them out. And as you now walk beneath their cooling shade and see their limbs swaying gracefully over surrounding objects, and their majestic heads rising to heaven, as if in supplication for blessings on the earth, do your hearts not go out towards them with a feeling of tenderness and love known only to a parent or a benefactor?

7th March, A. D. 1895.

ESSAY

BY

Dr. C. F. HODGE, Clark University, Worcester.

Theme:—Botanical Gardens.

In almost any language, savage or civilized, before the beginnings of authentic history, we have dim legends and myths of a blissful existence in garden paradises where "every tree that is pleasant to the sight and good for food" grew of its own accord, and man's work and pleasure was to tend the garden and enjoy its beauties and fruits. If only things pleasing to the eye and good for food were sole occupants of the soil, the world might be a good deal of a paradise still. At first sight this seems to be far from the case. Thistles and thorns, weeds and briars, dispute the field with roses and strawberries; and, too often, owing to man's poor tending, gain the upper hand. From this point of view the world is all a tangle of thorns and a vale of tears. Paradise is a long ways back; lost, in fact, in the irrevokable past. But is this view of nature the best after all? The world grows many things of the greatest value with no aid of man's tending. Even thistles and briars are better than drifting sands and barren rock: and to the indulgent eye of a botanist, even the most pestiferous weeds are often most "pleasing to the sight"; and I know that he would not for the world have one of them stricken utterly from his list. With proper tending, man's first appointed work, almost any plot of Mother Earth can be transformed into an Eden to any man's own taste. As human nature is now constituted, however, two things stand in the way of perfect attainment of anything very Edenic in the way of gardens. The first of these is that men nowadays are either too lazy or too busy about other things to attend to even a small piece of ground in the way Adam was instructed to do it. The other reason is that men have lost their taste for Eden. A good

smoke over a newspaper is worth more to our ordinary man than vistas of roses with all their glowing tints and fragrance. No slur is intended against either the cigar or the newspaper. If it is neither of these it is something else, some "fad" which consumes time and energy, and leaves the tending of Eden for the florist or someone else to do. If men get more satisfaction out of something else than the freshness and beauty of nature, with which he might easily surround himself, well and good. "If folks like that sort of thing, why that's the sort of thing they like"; and there's an end of it. The world may remain a pretty scraggy and barren place, in large spots, at least. Man has something more satisfying than anything that she can produce without his aid, and he is too engrossed otherwise to lend a hand. This is all very well. Each man to his taste. But there are disagreeable complications, to say the least.

When one son of Adam has followed his bent and has tended his garden; when his fruits and flowers are beginning to repay him for his labor,—the taste of some other son of Adam suffers a sudden reversion. Nothing seems to him so fair or desirable as choice flowers, or so luscious as grapes, pears and peaches. He comes around suddenly to his Edenic neighbor's point of view and begins to make his life a burden by begging and stealing, and sending his little children around to beg and steal; or, worse still, with five cents to make a weak pretence to buy the good things of Eden. "Just one flower," "only one apple"; it looks awfully stingy to refuse so innocent a request. But old-time rural ideas of above-board generosity do not apply to the conditions of life in the city. Each one person, as he or she asks for "just one," "only a few," forgets that if all such who would be inclined to ask for the "only one" were satisfied, not a single one would remain for the gardener himself. His trees, vines and bushes would be stripped as bare and barren as the gravel-pit next to his garden, or the back yards of his worthy neighbors, who profess to different tastes and higher satisfactions than those afforded by legitimate horticulture. This is a matter of the most serious import, and I have never chanced to live in a city where it demanded more speedy and vigorous treatment. Those who love their gardens and do all in their power to make their homes and grounds beautiful, are rewarded for their pains by having to fight off the gentry of other tastes; and worse than all the material loss of time and apples, is the dreadful strain on good nature and loss of patience which this state of affairs entails. To be obliged to stay at home Sundays and keep watch all other days and sit up nights in order

to stand some slight chance of gathering the fruits of intelligent culture, is more vexation of spirit than the crop is worth. Take a single case that has come within the writer's very limited acquaintance in your city. A young couple set their hearts toward the making of a home with a garden about it. A number of years of hard work and careful saving brings in enough to begin with. A lot on a fair hill on the, then, outskirts of Worcester is bought and a little house built. Not a tree or shrub graces the place, but moonlight nights, after work in the shop, you might see our friends planting trees together. While the gentry of elevated tastes are enjoying their cigars and beer, our young Adam and Eve have covered their little Eden with flowers; have planted elms and Virginia creeper; maples, apples, pears, peaches and grape-vines; and all manner of good things. As soon, however, as the trees begin to bear, the reversion of primitive tastes, which so strongly tends to bring all men back to Eden, sets in and a running fight begins. Up to the present this struggle has been going on for something over 50 years. Patience, strength and years have failed, while the Goths and Vandals have increased like the plague. Between the street and each apple tree the well-trimmed arbor-vitæ hedge, of over 40 years' growth, has been torn into ragged and unsightly holes and has been supplemented by a high barbed-wire fence. Finally, apple trees, thrifty, sound and bearing, have had to be cut down for no other reason than to give the dear old people a little peace of their lives. The pathos of this series of incidents is to me too deep for adequate expression, and would be intensified in the mind of all present did each know the couple in question. There is about them no trace of the nervous and stingy type of character which boys love to tease. They are whole-souled, kindly people, and generous of their good things to a fault. Other good people, less unselfish perhaps, but wiser in their day and generation, when I have asked them why they do not plant fruit trees, have told me that if they had fruit, their places would be overrun with boys, and that they had rather buy or go without than have the nuisance of either being overrun or keeping the vandals off.

What can this have to do with botanical gardens, do you ask? It is the very root of the whole matter. It was Adam's fault that transformed Eden into a patch of thorns and thistles, and to-day it lies solely with man to choose whether he shall live in a garden paradise or in a desert. Before we can have gardens, we must have men and boys, who are educated to know their value and respect their rights. To plant gardens before this state has been in some degree attained,

is to bring down the fiasco of Eden with the certainty and promptness with which a stone falls to the earth. And laws for proper care of the beauties of nature should certainly be vividly enough inscribed in the hearts of men to render superfluous the ghastly signs, "Keep off the Grass," "No Trespassing," "Beware the Dog."

It was my privilege to visit, during the past summer, a number of renowned gardens; places where men have done all in their power to provide everything that can minister to love of nature and beauty, and to the needs of science, and special and popular education. My purpose has been not so much to see everything contained in these gardens as to find out what sort of ideas and ideals men have been developing with regard to this most important subject; and, more than this, to discover as far as possible to what degree these gardens are fulfilling their mission of elevating taste and advancing science. A garden, like everything else that has any legitimate purpose in the world, must be for man and not man for a garden. If an institution, be it church, school, garden or factory, is constituted on the stilted ideas, false principles, or delusions of some one individual, it may drag out a painful existence for a time and do a great deal of harm; but all such things must die out and give way to things that fill the genuine needs of a healthy humanity. Nature has constituted this world a magnificent garden, with hundreds of thousands of kinds of plants and animals in it, all living in such relations to one another that the greatest amount of life and happiness possible is produced. Her endless variety is so skilfully massed and arranged that individuals or species are either not conspicuous or possess some charm and dignity. Some good man with a narrow and decided taste lays out a garden or a park. He has a penchant for some one tree or perhaps for yellow flowers. He indulges this yellow taste to such an extent that people organized on a liking for other and more subdued colors will be driven to distraction by a brief sojourn in his garden. Or a pedantic science may dominate the arrangement of a garden. Distinctions, of use in the science for certain purposes, but altogether provisional, temporary and artificial, are set up as though they actually belonged in nature. The result is a stilted, manufactured affair, with which nature or the love of nature has nothing to do.

Speaking of botanical gardens I do not wish to confine myself strictly to lines which an infant science has set up. It has been said by eminent entomologists that insects have actually called into being our highly colored and perfumed flowers. These mutual relations between plant and insect life constitute at once the most important

and fascinating chapters of both entomology and botany. But insects may become so numerous as to destroy the vegetation they are intended only to fertilize or prune. Then we must have birds and insectivorous animals to maintain the balance of nature. These in turn may become too numerous, like the sparrows of England, or the frogs of the Egyptian plagues. To keep these in check, we must have carnivorous animals. And so we have the satisfaction of finding that nature hangs together in an endless chain. Things are simplified by studying it one link at a time, and so our sciences come to have an artificial separateness which does not exist in nature and which it is well sometimes to ignore. This point of view must furnish my reasons for not adhering more strictly to the botanical feature of my theme. You could have no ideal botanical garden with nothing but plants in it, and many of its most interesting features will be found to lie in the border-land of mutual relations which subsist between animals and plants.

Come with me for a moment into a garden and see for yourselves. When we come out, we may compare observations and conclusions.

By payment of an entrance fee of a franc in the city of Antwerp, we may pass from the narrow, dirty streets and the red, burning desert of brick houses and peaked roofs, piled one on top another, into what? The change is so sudden, so unexpected, that it almost takes our breath away. It might be the gate to fairy-land, paradise, Eden, heaven. Call it anything you please. It is known as the Zoölogical Garden of Antwerp. Under the trees and roses the hot, stifling air of the city changes as by magic to softest and freshest air imaginable.

The iron gate, through which we have entered, opens into an avenue of trees and flower beds. Along one side extends a high wall, covered from top to bottom with dark-green ivy. On either side of the entire walk is a row of tropical birds in the most varied and brilliant plumage, each lightly chained to his perch. In front, the main garden opens up to view. Directly before us is an open grove with an inconspicuous band pavilion in the centre and a small café at one side. All about, under arbors and trees, are innumerable plain chairs and little tables. Beyond this grove, and scattered with apparent carelessness about the gently undulating surface of the garden, are other regular groups of trees. In and among them large animal-houses are so artfully concealed as scarcely to intrude upon the view. Beautiful fresh green lawns, with winding water-courses and tree-covered islands, enlivened with swans and all manner of water-fowl. Here

and there a most gorgeous burst of color, consisting in June chiefly of islands of roses in the dark-green foliage. In the distance, to one side, we see a rocky eminence covered with pines; and on the other side, what seems to be a snow-white mountain peak, one of the high Alps apparently, transplanted into the lowlands. We will come to that later in our round of the garden. From a grove on the left floats the music of innumerable birds, and from the other side, in the distance, swells the no less pleasing music of children's voices shouting and laughing at play. All about you seems bright and airy and free. In many directions your view wanders out into ample vistas of grove, lawn, lake and hill. Yet with every turn of the walk you find yourself in the coolest shade. Nothing in the whole effect has the slightest intimation of being set, formal, conscious, studied. Everything seems to be purely natural, "nature unadorned, adorned the most"; and yet you know that nature could not possibly in so limited a space make so many hits with never a miss. There must be magic somewhere; and gradually the realization dawns upon us that all is purest art so slyly concealed in nature as to nowhere appear to the eye.

We will not tarry in the animal-houses, although they contain the finest specimens of lions, tigers and leopards to be found anywhere short of their native haunts. The outside of the houses, however, deserves our attention. They are built of solid stone, as if to stand forever. Artificial, apparently natural, caves and grottoes can thus be made in their walls, so that each animal would seem to be lying in a den of his own selection. Almost every exposed wall is covered with ivy or climbing roses, or concealed by trees. In architecture many of the buildings are stamped with some characteristic of the style of the country in which the animals are native; and this is helped out by frescos covering exposed walls from ground to roof, giving you a view of a typical landscape of the region whence the different animals come. Thus you see in the distance the sands of the Sahara, groups of palms, the pyramids, on the horizon. You approach, and naturally enough come upon a family of giraffes and camels. All is thus in perfect harmony.

A feature of the labelling deserves a moment's notice. Each label consists of a porcelain chart of both hemispheres in bold outline, with the geographical distribution, the habitat, of each species painted upon each and burned into the plate. It makes a label, always bright and clean, giving at a glance the correct scientific and common name of each species with its home on the face of the earth. Art is said to be long. Science is even longer, if possible, and any such simple

device which can shorten and make real and vivid its necessarily long and difficult introductory chapters is worthy of consideration.

The white peak which we saw in the distance is a model of one of the high Alps in miniature, but quite large enough to escape being ridiculous and to furnish bedding.ground for an interesting collection of native alpine plants. The peak itself is built of a clean white rock to imitate the snow; and from all sides run little rivulets of clean water, forming many mossy pools and pretty waterfalls.

In no place of the size can we find so many pleasing pictures. Our view falls either upon a group of trees arranged with such consummate skill as to awaken no suspicion of art, and still the different varieties are so placed that their shades of green, silvery white or bronze, blend and form contrasts always pleasing. Each group of trees looks different and changes its entire character as you view it from different sides. There is nothing of the formal about them; neither studied variety or artificial symmetry, so distressing in French gardens and parks. If it is not one of these groves that catches the eye, it is sure to be an open, airy vista between them,—fresh green grass or water. Here, too, there is a refreshing absence of fussiness, no stars in different colored coleus, no filigree in geometrical figures, no fancy borders, no clipped hedges, no idiotic figures carved in juniper. We may well agree with Lord Bacon, when he says, "These things be but toys: you may see as good sights many times, in tarts." Green grass, water, picturesque groups of trees, need no garnishing. The effect of these is only heightened by different colors of foliage natural to the different species. And off to one side, against a dark wall of ivy, a gorgeous blaze of roses may enliven the scene without jarring upon its harmony. In fact, this perfect harmony of the whole is strongly suggestive of music, oratorio or symphony. It stands in marked contrast to the Annie Rooney jingles, Boulanger marches, or even cat concerts with which we have often been greeted in public parks and gardens elsewhere, poor hodge-podges of all manner of discordant or silly fussiness, crankism and notions, asserting themselves so clamorously that one naturally prefers walking a good ways around such a park to walking through it.

From the size of the trees we should judge that the designer of this paradise must be long since gone to his rest. He must have been a poet, artist and prophet combined. In our busy, hurried lives we are apt to think that anybody who may never have really looked at a tree in his life has good enough taste to plant our trees for us,—so far apart this way and so far apart that way, in rows and all the same kind.

The result is, that we have in fifty or one hundred years an effect, pleasing more or less perhaps, possibly actually tiresome by its artificiality and monotony. Nature in the same time and with the same expenditure of brawn might have given us a thing of beauty and a joy forever. The one who directed the planting of the Antwerp garden, possibly some reverend abbot with abundant leisure, a passionate lover of nature in general and of trees especially, and of cathedral music, must have possessed prophetic imagination to enable him to see how his trees would appear fifty, one hundred, two hundred years after his planting. In a city whose cathedral chimes have been ringing the hours and quarter-hours since prior to 1492, many such things are possible.

We next ask ourselves concerning the purposes of such a garden and their fulfilment. It evidently serves many uses. It is a breathing-space in a close and overcrowded city. It is an educational institution of the first order. Not only does it teach botany and zoölogy, but it inculcates canons of the highest taste. Do many come to gain these lessons? The grounds are full of happy looking people, whole families, from the parents and even grandparents down to the little children, all apparently enjoying the place immensely. An ample corner at the rear of the garden is evidently set apart for a children's playground, and is fitted up with a great number of swings and whirligigs, merry-go-rounds, low trapezes and turning-poles. Here we find hundreds, if not thousands, of little boys and girls, from about four to ten years of age, in a perfect ectasy of play. Close by, the laughing and screaming is almost deafening, but every tone is happy. There are collisions and tumbles, but the time is far too precious to stop and cry about them.

Full of people as the garden is, I think I am correct in saying that it is not disfigured by a single sign indicating proper conduct, and attendants are not conspicuous. Yet not even the smallest child evinces any desire to straggle off the walks, and there is not a trampled border or corner of lawn to be found in the entire place.

Financially, too, this garden is a success. It is one of the few institutions of the kind that is entirely self-supporting.

We are now ready to compare notes. The first question is, Should not every city have such a garden? At first thought, we exclaim: "By all means." Every city would derive an infinite amount of benefit socially, morally and intellectually from such an investment. It is not, however, until we begin to thread the close and dirty streets of Antwerp, see the houses built in solid blocks and piled one on the other, see people living in the peaks of the roofs like pigeons in a

loft, see the little narrow courtyards paved with stones, that the fact begins to dawn upon us that our first impression may be fundamentally wrong. Is it not too much of a good thing in a very small space? And is not the rest of the city altogether too much of a bad thing everywhere else? Given a city like Antwerp, and such a garden as I have described would do more for the salvation of its people than all its cathedrals. The people must use it as their only means of getting a breath of fresh air or a glimpse of nature. On the other hand, is it fair to ask, given a fairy garden, with the making of which the people have had nothing to do, and might not the very fact of its perfection tend to make the people careless of the ugliness of their own abodes? We are wont to congratulate ourselves that beauty is contagious. But unless the sight of it carries with it some knowledge as to how the beautiful effect is attained, and brings some impulse to put forth some effort to attain it, I doubt if this be true. Imitation and suggestion are very strong factors in the world's progress. The quickest way to clean up a squalid neighborhood is for some one in the middle of it to roll up his sleeves and make his own place shine. One after another his neighbors would catch the infection. But if an angel from heaven should come down and plant lilies and roses in one man's yard, the rest would fold their hands and await their turn, if each didn't grumble because he was not served first. Such a garden might pay expenses in Antwerp, and be a priceless boon to its people; but this is not saying that it would be equally appreciated in Worcester.

Another serious objection to such a garden, ideal as it seems, is that it is too highly spiced for every-day diet. Even lions and tigers, elephants and monkeys, are not by any means the most important things in the world; neither are the most enchanting vistas. Honey, gingerbread and pickles are all good; but if a child gets in the habit of living on them, he may lose his appetite for more essential food, grow up spindling and finally die of a broken stomach. The same is true of intellectual health and life. If interest is too much stimulated and indulged in the rare and strange, there is danger that it be lost for the great common things that really are most deeply and perennially interesting, and that touch our lives most closely on every side. In planning a garden, we must therefore take the above facts of human nature, and many others, into full account. And when we do this, we shall probably all agree that we would not exchange Worcester, with its garden-plats, fruit trees and lawns, for the ancient city of Antwerp, with its narrow, dirty streets and stone-paved courts and

its magnificent garden. Possibly we might agree further, that it would be better for the good people of Worcester to spend a good share of their time loafing and puttering about under their own vines and fig trees than in passively admiring even the best garden in the world.

Upon a still further point with reference to public gardens, I can scarcely hope for agreement from anyone. But I have thought best to present to you a plan of a garden as it has forced itself in my own mind, together with some of the considerations and reasons upon which it is based.

Besides its private gardens and public parks, every city needs a special garden for the popular and scientific education. It should afford a method, as easy and as free as possible from the dryness and technicality of the books and schools, by which any intelligent man, woman or child may gain a living, actual acquaintance with the common forms of life about them. I know a cold shudder creeps over almost every one at the mere mention of the words "education," "science." Ghastly visions of the endless weariness, the everlasting humdrum, the unnecessary tyranny of our school and college days, arise before us at their mere mention. The "knowledge" that was stuffed into us, like scrap meat into a sausage skin, is gone and we are glad for its departure. Of what value are gardens for this "education," this "science"? To those who have never felt the difference between learning and cramming it will be impossible to explain. To those who have, no explanation is necessary.

It is now nearly two and a quarter centuries since John Milton wrote his "Tractate on Education," and still the differences between living education and dead knowledge grinding, which he so clearly outlined, have made little enough progress in soaking through the ossified strata of the human skull. Even now committees of ten and committees of fifteen are cracking their brains to devise cramming machines, and with never a thought that just such methods and devices have been for centuries bursting almost all the poor, little sausage skins and spilling all the sausage. Along this line Milton wrote, in 1673, as follows:—

"And for the usual method of teaching the Arts, I deem it be an old errour of Universities not yet well recovered from the Scholastick grossness of barborous ages, that in stead of beginning with Arts most easie, and those be such as are most obvious to the sence, they present their young unmatriculated Novices at first comming with the most intellective abstractions of Logick and Metaphysicks; So that they having but newly left those Grammatick flats and shallows where they

stuck unreasonably to learn a few words with lamentable construction, and now on the sudden transported under another climate to be tossed and turmoil'd with their unballasted wits in fathomless and unquiet deeps of controversie, do for the most part grow into hatred and contempt of Learning, mocked and deluded all this while with ragged Notions and Babblements, while they expected worthy and delightful knowledge." These Milton gives among the reasons why the best youth of his day turned their backs upon high attainment in learning, and went their several ways, "ignorantly zealous," into the profession of theology; avaricious and carping, for they have never been taught "the heavenly contemplation of justice and equity," into the law; "hollow and unprincipl'd" into the pursuit of politics; or the wisest and best of all, since nothing better was presented to them in their education, spend their days in "ease and luxury," "feast and jollity." "And these," he says, "are the fruits of mispending our prime youth at the Schools and Universities as we do, either in learning meer words or such things chiefly, as were better unlearnt."

More especially toward the line of our botanical garden Milton goes on: "I shall not detain you longer in the demonstration of what we should not do, but strait conduct ye to a hill-side, where I will point ye out the right path of a vertuous and noble Education; laborious indeed at the first ascent, but else so smooth, so green, so full of goodly prospect and melodious sounds on every side, that the harp of Orpheus was not more charming. I doubt not but ye shall have more adoe to drive our dullest and laziest youth, out stocks and stubbs from the infinite desire of such a happy nurture, than we have now to hale and drag our choicest and hopefullest Wits to that asinine feast of sowthistles and brambles which is commonly set before them, as all the food and entertainment of their tenderest and most docible age. I call, therefore, a compleat and generous Education that which fits a man to perform justly, skillfully and magnanimously all the offices both private and publick of Peace and War."

War does not cut the figure it did two hundred years ago; but, on the other hand, the "offices of peace" have multiplied and might furnish men with occupations as absorbing and interesting, if they were educated to take hold of them. The books and schools do not afford the kind of education that opens to men the living world,—the world of reality; in such wise that they see its important problems and are given some idea of ways and means of grappling with them, and some hope of their solution. I would have a garden designed to do this. It would not infringe in the least upon our experiment stations;

but would supply them with youth, those whose inclinations lead them that way, who had faced the problems as they exist in living nature, who have formed some reasonable notion of their exteme difficulty and who have come to an intelligent determination to solve them. Not many would elect to follow out lines of special investigation; but a good square look at nature fairly in the face will benefit all, and after taking it they must go their several ways with some respect at least for her laws. Those artistically inclined will find and be inspired by beauties of which they have not dreamed. The philanthropic, the practical, the scientific, will find problems, the value of whose solution cannot be reckoned in thousands or even in millions of dollars.

The details of a garden that shall be calculated to do this will not detain us long. I have failed to find exactly my ideal in any of the gardens of the Old World that I have been able to visit. Farthest from it is the great botanical of Paris, the Jardin de Plantes. The strictly botanical part of it is a large, rectangular field, enclosed in an iron fence. Here a "dry as dust," artificial and superficial science has had iron sway. The field is as flat as a table, and as rectangular. It is laid out in rectangular walks and small rectangular beds. Each bed is supposed to contain a single species of plant, and related species and genera stand close together. For man, this is the easiest possible arrangement. It is like the arrangement of cards in a card catalogue. But not by any means is this the easiest for the plants. Their wishes have been altogether ignored. Not one in a hundred has the conditions under which it would best grow in nature; and as a result they are spindling and sickly, the great majority of them. It is a fitting criticism upon such a superficial science, that in the midst of a teeming city, this entire enclosure, where science has endeavored to make all out-doors as formal and forbidding as possible, is as empty of life as a Death Valley. It would seem that even the sparrows avoid it; and for at least one fine afternoon in early September this entire enclosure was monopolized by two lone pilgrims from across the sea. I could not imagine anyone going in there of his own free will and accord.

Many of the botanical gardens attached to the German universities are vast improvements upon the Paris Jardins de Plantes from an artistic standpoint. In general, however, the chief design in these gardens is to serve technical and special purposes of university students; and the general public does not crave the admission that is denied it.

We should not neglect to mention that nearly every German city,

and even towns, have well-kept parks; and what is much more appreciated and indulged in by the people than even the parks, large tracts of apparently primeval forest. Aside from the well-made and gracefully designed walks in these forests, nature has full and absolute sway. And no truer testimony to man's primitive love of pure nature could be given than the solid streams of people, flowing out after the work of the day from the sultry city into these forest walks. In our garden we must have the natural forest.

Time fails me in which to even mention briefly the Royal Gardens at Kew, near London, and also some gardens in our own country that rank among the finest in the world; notably the Missouri Botanical Garden, the botanical garden at Cambridge, and others. Their very magnificence places them beyond us; and the enormous expense of their maintenance, for the Missouri garden nearly $100,000 a year, enforces a realization of the fact that a country can afford but a few of such great institutions.

I will ask you to consider with me for a moment the charms and advantages of an altogether different kind of garden. Suppose we had a tract of land just as God and nature made and planted it. Within reasonable limits, the smaller it is the better, so that it contain a sample, if possible, of all the kinds of soil and slopes of "Glade and Mead," and exposures to be found in, we will say, Worcester County. It should have a bit of river, a pond, a bog, a grassy meadow, hillside slopes,—north, south, east and west,—caves and rocks and springs. It should be as near the city as possible and readily accessible to all; and we will suppose that it is covered with vegetation and peopled with animals, from microscopic infusoria to American Indians, just as it was before the Mayflower landed. What lessons would such a plot teach us? In the first place we would have its geology from the Archean rocks through the Glacial drifts to the flint arrow-heads of the Age of Man. We have also the native animals, each in its chosen nest or pool or hole or den or covert. These all will help to complete the endless chain of nature, animate and inanimate, which our sciences are so prone to break into fragments, but which must retain its entirety, if life is to survive. But passing specially to the botanical side, what do the trees and plants teach us as they stand in their natural places? Each kind, from the lichen on the rock to the pine and the oak, would tell us, did we but care to read its story, of geological ages of unremitting struggle. And each would tell us, did we but study its constitution aright, exactly what weapons and cunning it has used; just what chemical and physical

forces it has taken advantage of,—to maintain its struggle for life in exactly the place we now find it. Are these lessons of no value? We clear off this garden as if they were not. And it is only when man plants in its place the things he desires to grow, and sees that his peaches turn yellow, his wheat turns black, his apple trees rust and so on; only when the things of his planting are swept from the face of the earth,—does man realize that it is well worth his while to study the ways and means that nature has found necessary for the maintenance of her various forms. The very first thing we must realize in this great study is that the problems are far too vast and complicated for a narrow and selfish utilitarian spirit to grapple. The commercial spirit may see that to know something about wheat-rust may be worth $200,000,000 a year to this country, or to know something about diphtheria or consumption may save thousands of valuable lives. What of that? it replies. We can't find out these things and we know there is money in this thing or that which we can do, and that is the end of it. To deal with these problems, the broadest view that the highest university education can give is clearly necessary to give a sound basis for thinking out and reasoning out these problems. They are difficult. They can not be solved at will or at dictation, in one week or in one year. There must be a broad knowledge, and behind this a spirit entirely above the commercial; a spirit that knows no discouragement, in whose dictionary there are no "can'ts"; the spirit of the mountain climber who overcomes all difficulties, and the harder the climb the better he likes it. When we have a public education that produces such spirits, we may hope to have the question of peach yellows and consumption and the like cleared up once for all, instead of frantically jumping up and down in the same place year after year.

I do not mean that it would convert Worcester into an agricultural or horticultural experiment station. There is no danger of that. I would strive to so present the great facts of botany and other natural sciences in such wise that everybody would learn and appreciate the enormous value attending the solution of these problems and gain a fair estimation of their difficulty; and now and then some one might step forward with the means to forward the good work or with the knowledge, ability and will to solve some particular problem. As one means of developing such a state of mind, a proper educational garden must prove most efficient.

No such primitive garden as I have described exists in this vicinity at least. The land has been cut over and burned over and ploughed

over, and numerous new foreign species have been introduced. Many of the fragments, however, still exist; and these might be gathered, and so planted and arranged as to become, year after year, of greater and greater practical value for the enjoyment and education of the city. The trees should be planted so as to show their characteristic forms of growth, both in the close forest and in the open glade; and the garden could thus be given both the charm of the forest and the beauty of grouping that we found in the garden of Antwerp. Each tree, shrub and herb should be given as nearly as possible just the sort of ground and location and surroundings that it would choose for itself in its native haunts. Of course this would conflict somewhat with the grouping together of related species and genera. These should, as far as possible, be grouped naturally together for easy comparison, and each should be plainly labelled. A generous compromise between the demands of a rigid science and those of art and nature will conduce to the real good of the whole.

Does it pay to teach botany and zoölogy in the schools? If it does, why either stuff it in or dole it out in desiccated book cultures and homœopathic doses? thereby making all who are treated immune from botany or zoölogy for the rest of their lives. The real thing taken in full strength, "straight," and plenty of it, is what we need. Let the children live in actual botany, go on a botanical drunk, if you please, for a week at a time. They never could altogether forget or utterly despise their botany after even one such bout. Take the time, when as Milton says, "In those vernal seasons of the year, when the air is calm and pleasant, it were an injury and sullenness against nature not to go out, and see her riches, and partake in her rejoicings with heaven and earth." How many days of "injury and sullenness" can we not recall, cooped up in a dusty school-room through the rare days of June or October.

Who should plant and care for this garden, do you ask? Under proper direction, let the school-children themselves take a liberal share in it. The one thousand species of plants in Worcester County would step into place as though the "Brownies" were at work. And you could rest assured that no child who has put forth real effort in its behalf, who has scoured the hills for some rare plant and set it out in the kind of place he found it growing in, will ever raise his hand to injure any specimen in the garden.

For the sake of science and general culture, I should wish to have the native flora attended to first. After this the claims of horticulture, strictly speaking, might be considered. Worcester has too

many others better able than myself to present her claims. Nothing is more beautiful than trees covered with fruit. And a public Fruticetum would be a means of exhibiting fruit at its best, and of stimulating culture. This might be added to our garden when public morality has reached such a point that every child over six years of age shall be too thoroughly grounded in principle to steal, even under severe temptation, and be imbued with too much self-respect to beg under any circumstances.

14th March, A. D. 1895.

ESSAY

BY

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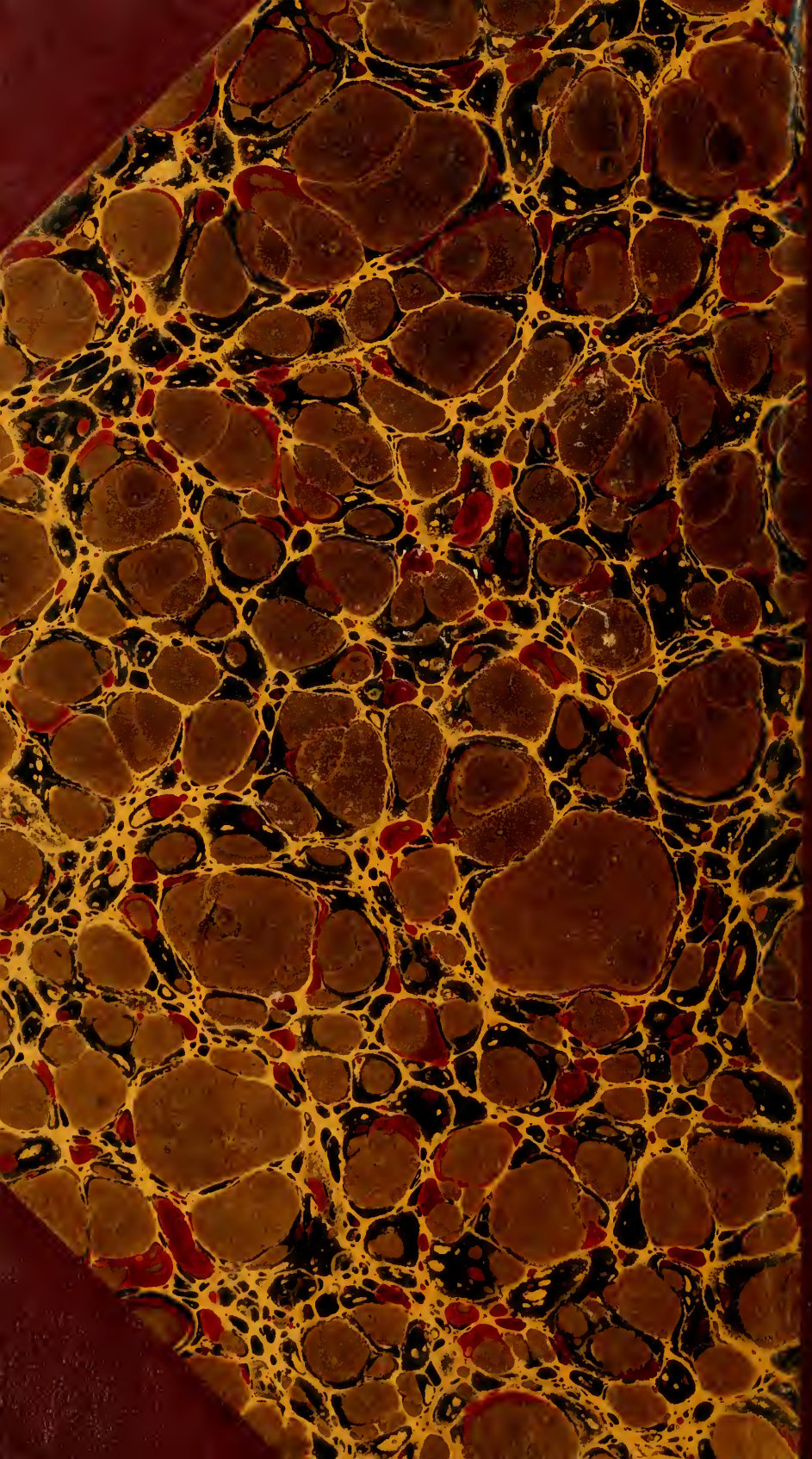
Theme:—Animal Intelligence.

When we apply ourselves to the study of the orders of lower animal life, I think we are impressed with two things. First, the prodigious number and variety of forms in which animal life is seen upon this earth. There is an enormous range and variety in the structure of the animal world. Then, again, comes the correspondingly great range of what we may call intelligence, or something which, by a stretching of the definition, may be termed that. It ranges from what we may call zero, where the animal life is hardly more than that found in the vegetable, through our domestic animals, as the cat and dog, up to the monkey and ape, which approach most nearly our own structure and our own intelligence. Then there are forms of life that have a great amount of intelligence, only of a different variety. In this class we include the ant, bee and wasp. I believe that it is a fact that no less than eighty thousand kinds of beetles have been described, classified and catalogued, and yet the insect world has not been at all thoroughly canvassed.

In comparing the intelligence of animals and men, we cannot avoid comparison as regards the higher animals, there are so many points that are analogous; and when it comes to intelligence they accord with us in a great many respects. You well know how savages look upon animals. In many cases they exalt them above men and maintain that they derive their family descent from certain lines. There is undoubtedly a fixed belief on the part of Indians and savages that souls of men pass and repass between animals and men as a sort of retribution for sins committed during life.

Our great tendency is to read into the minds of animals and test them by our own minds. And this is even so when it comes to scientific men,—those who have made the subject a life-long study. There are two great schools of naturalists,—those who believe in the intelligence of animals and those who disbelieve. They are constantly and continually charging each other with humanizing them on the one hand and shutting it off on the other. We must have some test of what we call animal intelligence, and without going into the thing from a scientific standpoint I have fixed the test to be something like this: When an animal forms within itself an immaterial representation of an external fact and acts upon it, then I say that animal manifests intelligence.

As an illustration of this point, allow me to tell a story that I think will thoroughly explain my definition. An English naturalist placed a pike, one of the most stupid of fish, in a glass tank and separated him from a number of other smaller fishes which, if at liberty, would have furnished him with food. No sooner had he been placed in the tank than he made a dive for one of the smaller fishes, but only to be nearly stunned by swimming with such force against the glass, which he did not discern. This continued for nearly three months, but at last the pike had learned caution and did not attempt to get at the other fish. Even when the partition was taken away, the fish showed no desire to attack what would naturally have been his prey. That pike did not do as he wanted to, but checked his own natural action by a mental picture of what he had undergone in the past. Whenever an animal has mental representation rather than present desire, I call the animal intelligent.

It is hard to say where instinct leaves off and reason commences. Instinct has certain marks and peculiarities, and it is pretty evenly divided among animals of the same species. Intelligence on the other hand varies considerably. Instinct is mechanical; it works by a kind of impulse for an end that the animal does not appear to foresee. Reason is self-conscious. There is not the distinctness between the two that we used to think. Instinct always has in it a little dose of reason. Instinct is not blind, neither is it invariable. There is an abundance of evidence to show that surroundings have much to do with instinct.

I have in a ragged sort of way said that you cannot separate instinct from reason, and between them there is a constant interplay. They are so closely connected that they breed together and the offspring is what we call common-sense.